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Anthropology

Preliminary data of the investigation of the national programme "Anthropological characterization of the Bulgarian population"

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The anthropological characteristics of the population in separate countries gives a rich information about the physical development of the modern man in connection with his concrete manner of life and work. Representative anthropological data about the population in different countries at the end of the present century can be a solid base for comparative studies with similar data from passed generations and can be a foundation prognosticating the anthropological characteristics of the coming generations. Through the collected anthropological data, the morphological status of the Bulgarian population at the end of the 20th century is characterized. Grouped together and compared on the ground of the natural-geographic, ecological, socio-economic, professional and other factors, the data can give a basis for evaluation and prognostication the influence of that factors on the morpho-functional characteristics of modern man. The bone remains' data from the archaelogical excavations in Bulgaria (Paleolith — Late Middle Ages) give an idea of the epochal tendences in the development of the modern man on the territory of the country.

Key words: anthropology, physical development, cephalo- and somatometry, cephalo- and somatoscopy, physiometry, odontoscopy, dermatoglyphics, socio-economical factors, professional factors, demographic processes, paleoanthropology, brachycephalization.

The population of every country is an unique except of the world population which has no analogue, not only with its historical development, but also because of the specificity of its natural-geographic and socio-economical conditions of life. As a peculiar biological reflector, the anthropological characteristics of the population in different countries gives a rich information of the physical development of the modern man in connection with the concrete manner of life and labour. Being traced towards the centuries and grounded in different territories, the anthropological investigations give possibilities to be found and studied the specific regularities in the physical development of the man in our times. Data for analysis and revaluation of the acceleration and retardation processes, as well as the biological maturation and growing older (senescence) can be received. Moreover, the representative anthropological data about the population in different countries

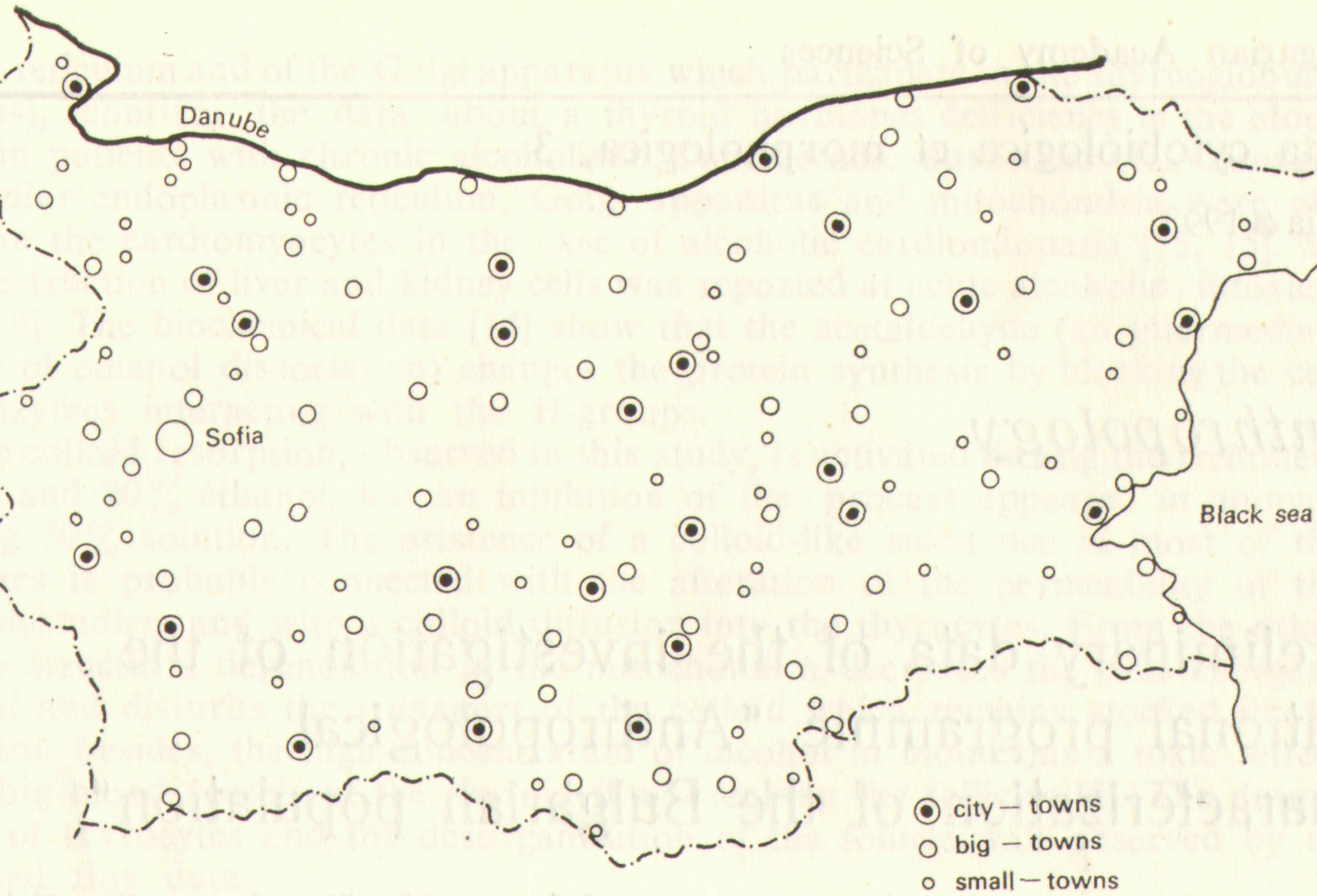


Fig. 1. Bulgarian national anthopological survey. Investigated settlements

at the end of the century can be used for a solid base of a comparative studies with similar data of past generation [22, 23, 32, 48], and for a prognostic base of the coming generation anthropological characteristics.

Subject of the anthropological investigations are the individuals or representative groups of the population from different geographic regions and states, being various occupated, having varied socio-economical and family status, or grouped in some other criteria. In the period 1989-1992 years commonly 5171 adults at the age of 30-39 years from which 2412 men and 2759 women from 118 setlements (administrative-towns, small towns and villages) are studied (see the enclosed map, Fig. 1). The anthropological programme by which is taken the survey of the population consists of 2 basic parts (see enclosed anthropological card): *questionnaire form* by which information about social, professional, demographic and health-biological status of the investigated is taken (commonly 40 questions); *metric-scopical part* which gives data about the anthropological characteristics of the individual (30 cephalo- and somatoscopical features, 20 cephalometric features, 68 somatometrical features — 26 measured bilaterally to be rendered the body asymmetry, 5 basic physiometric features, 26 odontoscopic features, palm and finger dermatoglyphic prints of both hands, and fullface and halfface photographs).

The bone remains from the archaeological excavations are studied after the conventional anthropological methods [11]. They cover 4000 skeletons from 150 necropolis dated from the Palaeolith (40 thousands years B. C.) up to the end of the XVIII century (see the enclosed map, Fig. 2).

The more important directions in which fundamental and practical-scientific results from the national anthropological programme can be expected are:

1. Evaluation of the influence of the following factors on the physical development of man:

1.1. Natural-geographical and ecological conditions of living;
1.2. Urbanization degree of the settlements;
1.3. Socio-economic factors;

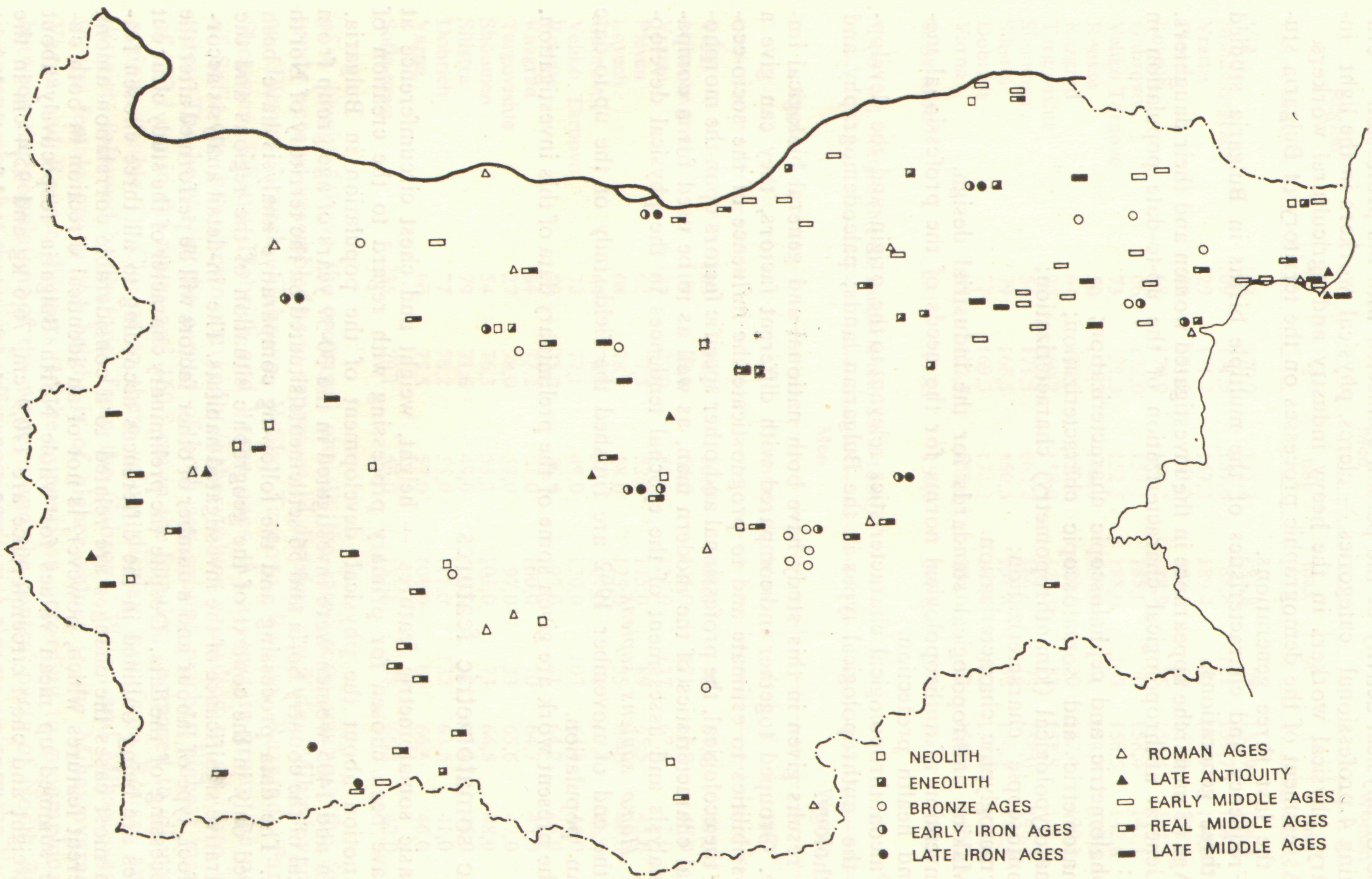


Fig. 2. Bulgarian national anthropological survey. Investigated necropolis

1.4. Living conditions, nutrition and manner of living;
1.5. Type of physical activity of the person connected with his profession — evaluating 4 professional categories — clercs, physical workers in the light industry, physical workers in the heavy industry and agricultural workers.

2. Assessment of the demographic processes on the territory of Bulgaria studied in the last three generations.

3. Frequency and characteristics of the multiple births in Bulgaria studied in the three generations.

4. Age of menarche appearance in the investigated women and their daughters.

5. General anthropological characterization of the up-to-date population in Bulgaria:
5.1. Cephalometric and cephaloscopic characterization;
5.2. Somatometric and somatoscopic characterization;
5.3. Somatotypological (kinanthropometry) characterization;
5.4. Odontoscopic characterization;
5.5. Dermatoglyphic characterization.

6. Making anthropological standards for the industrial design.

7. Invention of anthropological norms for the needs of the professional medicine and health protection.

8. Paleoanthropological characteristics relevant to the origin and the development of the anthropological types in the Bulgarian lands; paleodemography and paleopathology.

The results given in this study have both national and general biological importance. Grouped together and compared with different factors, they can give a good possibilities to estimate and to prognosticate the influence of the socio-economical, the ecological, the professional and other specific factors upon the morpho-functional characteristics of the modern man, as well as to be used for a comparative analysis and assessment of the epochal tendences in the physical development of *Homo sapiens sapiens*.

At the end of november 1992 are finished the field-study of the up-to-date Bulgarian population.

In the present work are given some of the preliminary data of this investigation.

I. Basic somatometric features

Three basic somatometric features — height, weight and chest circumference at pause have been chosen for primary processing with regard to the creation of general notion about the physical development of the population in Bulgaria. 1256 men and 1405 women were investigated in the 30-39 years of age group from the capital of the country Sofia and 56 settlements situated on the territory of North Bulgaria. The data processing and the following comparative analysis have been considered only in the context of the geographic situation of the regions and the administrative significance of the investigated habitats. The in-detail analysis according to foci, type of labour and a number of other factors will be performed after the final processing of the data. Despite the preliminary character of the study clear cut tendencies are being outlined in the differences according to all three chosen features. In most cases the changes are related to a considerable correlation among the different features which, however, is not of an identical direction in both cases. The summed up mean values for whole North Bulgaria respectively about height, weight and chest circumference are 170,9 cm, 76,6 kg and 95,4 cm in the male group and 158,3 cm, 65,6 kg and 82,5 cm in the female one. After the height categories of M a r t i n and S a l l e r [11] the men are tall and the women are

Table 1. Stature (North Bulgaria and Sofia-town)

Region	Men				Women			
	n	$\bar{x}$	min	max	n	$\bar{x}$	min	max
Vidin	103	170,9	155,3	183,8	78	158,9	144,4	178,9
Mihaylovgrad	109	171,5	157,6	188,8	121	159,7	146,1	170,7
Vratza	129	171,2	157,3	189,4	137	158,1	144,3	172,1
Pleven	62	171,7	153,2	183,0	89	157,9	138,9	175,8
Lovech	68	170,9	159,7	188,9	55	158,4	144,1	175,2
Gabrovo	66	172,0	158,1	185,0	70	158,4	147,1	170,0
Veliko Tarnovo	73	171,3	152,5	188,0	103	158,5	142,8	177,2
Rousse	50	172,7	156,0	183,4	61	158,7	145,5	174,8
Razgrad	64	169,0	152,0	185,5	70	157,4	139,1	169,4
Targovishte	27	169,2	159,0	178,3	33	157,8	143,6	171,1
Shoumen	54	171,5	162,2	184,6	73	158,0	146,3	170,8
Silistra	79	168,5	150,5	181,8	52	156,9	142,7	167,6
Dobrich	77	169,3	152,3	187,4	122	157,4	135,4	173,4
Varna	60	172,7	155,6	186,0	63	158,9	145,2	169,5
Sofia-town	235	173,1	157,0	190,4	278	160,8	148,0	173,7

Table 2. Weight (North Bulgaria and Sofia-town)

Region	Men				Women			
	n	$\bar{x}$	min	max	n	$\bar{x}$	min	max
Vidin	103	76,5	50,0	106,0	78	67,6	39,0	112,0
Mihaylovgrad	109	79,6	54,0	125,0	121	67,0	48,0	94,0
Vratza	129	79,0	50,0	121,0	137	67,3	42,0	115,0
Pleven	62	77,3	52,0	115,0	89	65,5	45,0	90,0
Lovech	68	78,9	58,0	125,0	55	64,6	46,0	92,0
Gabrovo	66	75,9	55,0	107,0	70	67,4	46,0	120,0
Veliko Tarnovo	73	77,1	49,0	120,0	103	64,8	44,0	105,0
Rousse	50	75,4	56,0	99,0	61	64,7	46,0	95,0
Razgrad	64	72,2	51,0	100,0	70	64,7	45,0	100,0
Targovishte	27	78,0	57,0	97,0	33	65,6	47,0	88,0
Shoumen	54	76,3	53,5	101,0	73	64,5	48,0	96,0
Silistra	79	71,6	49,0	100,0	52	63,1	46,0	96,0
Dobrich	77	76,2	55,0	111,0	122	63,5	41,0	102,0
Varna	60	75,5	52,0	108,0	63	66,6	46,0	100,0
Sofia-town	235	79,1	55,0	133,0	278	65,5	42,0	150,0

of a height "above the average" one. In the intergroup analysis the foci under study were so assembled as to represent 14 districts the Vidin, Mihaylovgrad, Vratza, Pleven, Lovech, Gabrovo, Veliko Tarnovo, Rousse, Razgrad, Targovishte, Shoumen, Silistra, Dobrich and Varna ones. As a separate group the population of Sofia-city has shown markedly higher values according to all three basic features. The height in the capital of both sex groups reaches highest mean values of 173,1 cm in the males and 160,8 cm in the females, compared to all investigated regions (Table 1). Closest to these values display men from Rousse and Varna districts followed by the ones from the Gabrovo, Pleven and Mihaylovgrad ones. In the female group the height is of higher values in the Mihaylovgrad, Vidin, Varna and Rousse districts. In the comparison according to geographical criteria between the population of the western and the central parts of North Bulgaria it is noteworthy that the height difference is minimal, the males from the Vidin, Vratza and Mihaylovgrad regions are only by 0,3 cm shorter and the women are with

Table 3. Chest circumference in pause (North Bulgaria and Sofia-town)

Region	Men				Women			
	n	$\bar{x}$	min	max	n	$\bar{x}$	min	max
Vidin	103	96,0	81,2	113,5	78	84,8	66,7	115,0
Mihaylovgrad	109	98,0	75,2	123,0	121	84,0	69,4	105,0
Vratza	129	97,3	78,0	118,9	137	85,1	65,0	120,0
Pleven	62	94,1	81,0	110,5	89	81,4	68,7	103,5
Lovech	68	95,9	83,3	120,0	55	81,0	66,7	97,3
Gabrovo	66	94,2	81,0	109,0	70	82,3	69,2	110,8
Veliko Tarnovo	73	96,3	72,4	130,5	103	82,1	66,5	105,0
Rousse	50	93,9	80,0	111,0	61	80,4	67,7	100,5
Razgrad	64	92,5	80,0	106,0	70	81,7	68,5	113,5
Targovishte	27	95,2	83,8	105,5	33	81,5	71,2	100,2
Shoumen	54	94,5	82,0	111,0	73	81,0	70,0	100,5
Silistra	79	92,4	78,0	112,5	52	80,1	68,0	103,0
Dobrich	77	96,4	81,0	115,0	122	82,0	68,1	103,0
Varna	60	94,3	79,0	108,0	63	82,1	62,8	112,7
Sofia-town	235	99,1	82,5	127,6	278	82,8	68,1	124,4

0,5 cm taller than the ones in the Pleven, Lovech, Gabrovo and V. Tarnovo districts. Markedly lower values for the height are found in the east regions (Rousse and Varna excluding). The inhabitants of the Silistra and Razgrad regions are the shortest. The lowest values of the weight and chest circumference are found on the territory of the Silistra district as well (Tables 2 and 3). The height of the population from Targovishte and Dobrich is also low but the values of weight and chest circumference are relatively higher especially in the men. Comparing the inhabi-

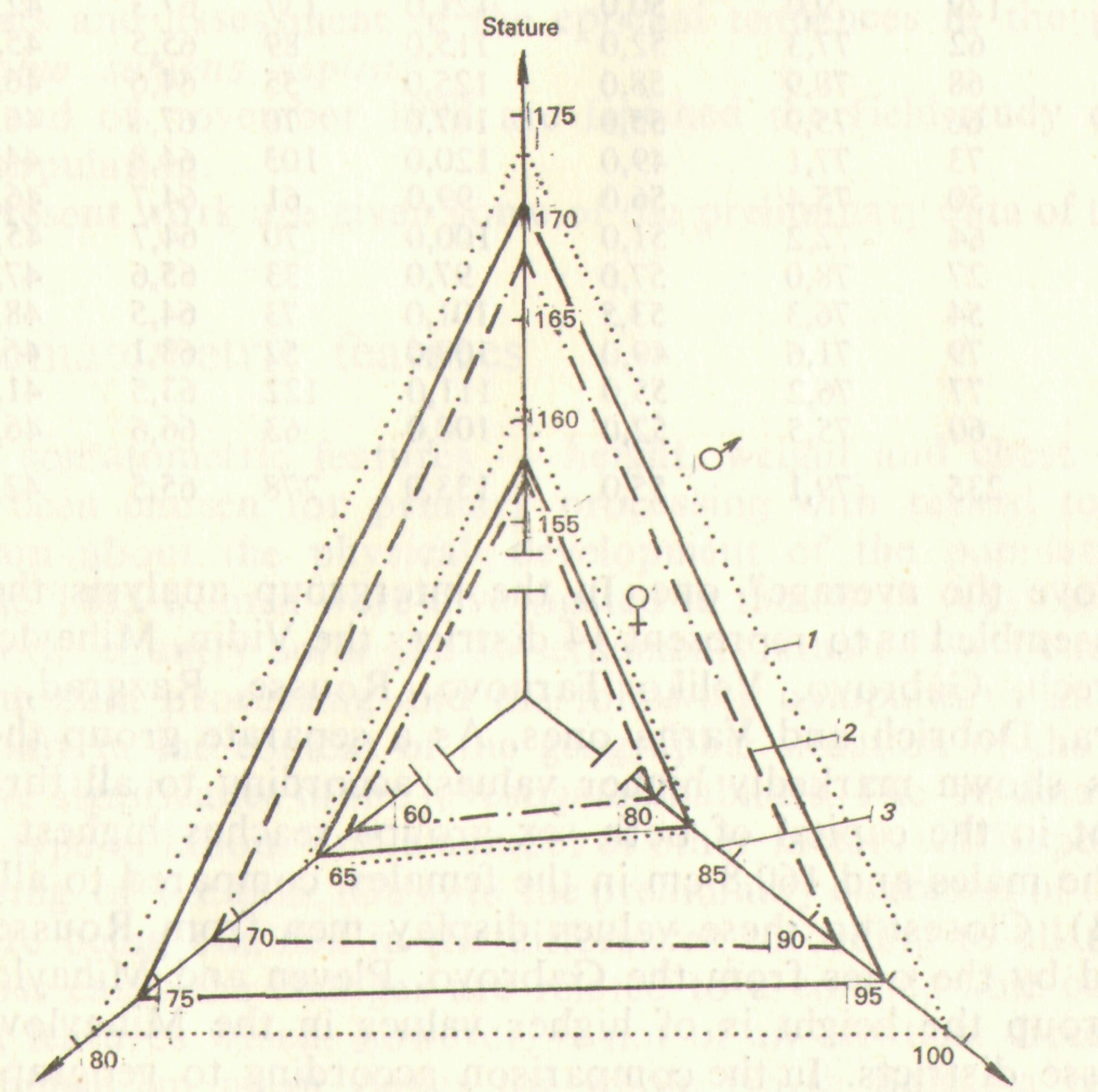


Fig. 3. Relationships between the three basic somatometric features
1 — Sofia; *2* — Silistra; *3* — North Bulgaria

T a b l e 4. Stature (administrative centres)

Administrative centre	Men				Women			
	n	$\bar{x}$	min	max	n	$\bar{x}$	min	max
Sofia	235	173,1	157,0	190,4	278	160,8	148,0	173,7
Vidin	34	172,8	159,8	183,8	22	160,4	153,1	169,1
Mihaylovgrad	34	172,5	159,2	188,8	33	159,0	146,1	169,4
Vratza	26	172,0	162,7	182,6	42	159,1	144,3	172,1
Pleven	38	172,4	161,0	183,0	45	159,2	140,8	175,8
Lovech	42	170,4	159,7	185,4	27	159,4	148,6	175,2
Gabrovo	31	170,5	158,1	183,1	39	157,8	147,1	169,4
Veliko Tarnovo	22	172,5	152,5	178,8	20	160,6	147,4	170,4
Rousse	38	172,3	156,0	183,3	37	160,1	148,1	174,8
Razgrad	36	170,4	152,1	185,5	40	156,8	139,1	169,3
Targovishte	10	171,2	161,2	178,3	14	160,3	153,4	171,1
Shoumen	29	172,3	163,6	181,0	45	157,7	146,3	170,8
Silistra	21	168,6	150,5	177,3	26	158,4	145,2	167,6
Dobrich	24	169,3	154,2	187,4	52	157,5	146,2	170,2
Varna	33	174,3	160,2	185,0	38	158,8	145,2	169,5

T a b l e 5. Weight (administrative centres)

Administrative centre	Men				Women			
	n	$\bar{x}$	min	max	n	$\bar{x}$	min	max
Sofia	235	79,1	55,0	133,0	278	65,5	42,0	150,0
Vidin	34	77,4	57,0	101,0	22	70,2	51,0	98,0
Mihaylovgrad	34	82,1	60,0	117,0	33	65,5	48,0	90,0
Vratza	26	79,5	58,0	107,0	42	68,3	45,0	115,0
Pleven	38	77,8	60,0	110,0	45	64,2	46,0	90,0
Lovech	42	79,9	60,0	125,0	27	63,9	46,0	90,0
Gabrovo	31	73,7	55,0	90,0	39	67,2	46,0	105,0
Veliko Tarnovo	22	73,0	50,0	85,0	20	62,1	44,0	85,0
Rousse	38	75,8	56,0	96,0	37	64,0	48,0	95,0
Razgrad	36	72,8	53,0	100,0	40	61,4	45,0	85,0
Targovishte	10	80,0	65,0	97,0	14	66,0	50,0	88,0
Shoumen	29	76,0	53,5	101,0	45	64,2	49,0	96,0
Silistra	21	70,9	57,0	83,0	26	64,4	46,0	96,0
Dobrich	24	72,3	55,0	89,0	52	62,0	41,0	95,0
Varna	33	74,7	60,0	93,0	38	61,8	49,0	93,0

tants of the Dobrich and Silistra regions with insignificant differences in the height the men from the first district are heavier and with a larger chest circumference while in women the weight is almost identical and chest circumference shows a slight prevalence for the first ones.

Interesting intersexuel differences were established in the three features upon comparing the average of the capital population with the mean values for the whole North Bulgaria ones (Fig. 3). In the males the distances are almost equal in all three peaks while females at a considerably higher value of the height have a chest circumference only 0,4 cm greater and even a lower weight (by 0,1 kg). Greater intersexual differences for weight and chest circumference are typical for separate regions in North Bulgaria too. For example, the maximum weight for the males is found in Mihaylovgrad followed by the men from Sofia, Vratza and Lovech. Its greatest mean value in women is registered in Vidin, Gabrovo, Vratza and just then it is followed by Mihaylovgrad and Sofia. With markedly greater chest circumference are the men from Sofia and Mihaylovgrad as are the women from Vratza and Vi-

T a b l e 6. Chest circumference in pause (administrative centres)

Administrative centre	Men				Women			
	n	$\bar{x}$	min	max	n	$\bar{x}$	min	max
Sofia	235	99,1	82,5	127,6	278	82,8	68,1	124,4
Vidin	34	95,2	83,7	110,0	22	85,4	72,0	102,4
Mihaylovgrad	34	100,3	75,2	117,8	33	81,9	69,4	93,5
Vratza	26	97,2	83,8	118,9	42	84,8	70,5	120,0
Pleven	38	94,3	81,0	108,0	45	79,8	68,7	103,5
Lovech	42	96,9	83,5	120,0	27	79,6	66,7	93,0
Gabrovo	31	93,6	81,0	109,0	39	82,4	69,5	109,3
Veliko Tarnovo	22	92,2	72,4	100,5	20	80,0	66,5	101,0
Rousse	38	93,7	80,0	111,0	37	79,4	67,7	100,5
Razgrad	36	92,1	82,2	103,0	40	78,9	68,5	94,0
Targovishte	10	96,6	88,5	105,5	14	81,8	71,2	100,2
Shoumen	29	93,9	82,0	111,0	45	80,8	70,0	100,5
Silistra	21	91,2	79,0	99,0	26	80,8	68,0	103,0
Dobrich	24	94,5	83,0	107,0	52	80,3	70,4	100,1
Varna	33	92,8	79,0	108,0	38	79,0	66,7	103,6

din (Table 3). Naturally, there exist also local deviations related to the size and administrative importance of the studied settlements which are cleary demonstrated upon comparison of the population from the district centres. The mean values calculated about them are (Tables 4, 5, 6) in almost all cases higher than the ones summarized for the region. The greater height of men from Varna, Vidin and V. Tarnovo is readily standing out while in Dobrich and Silistra the values remain unaltered. In women from Silistra the height measured in the administrative centre is 1,5 cm greater.

The data presented tracing the variations according to the three basic somatometric features make the tendency towards decrease of height, together with the diminution of weight and chest circumference in direction from the west to the east

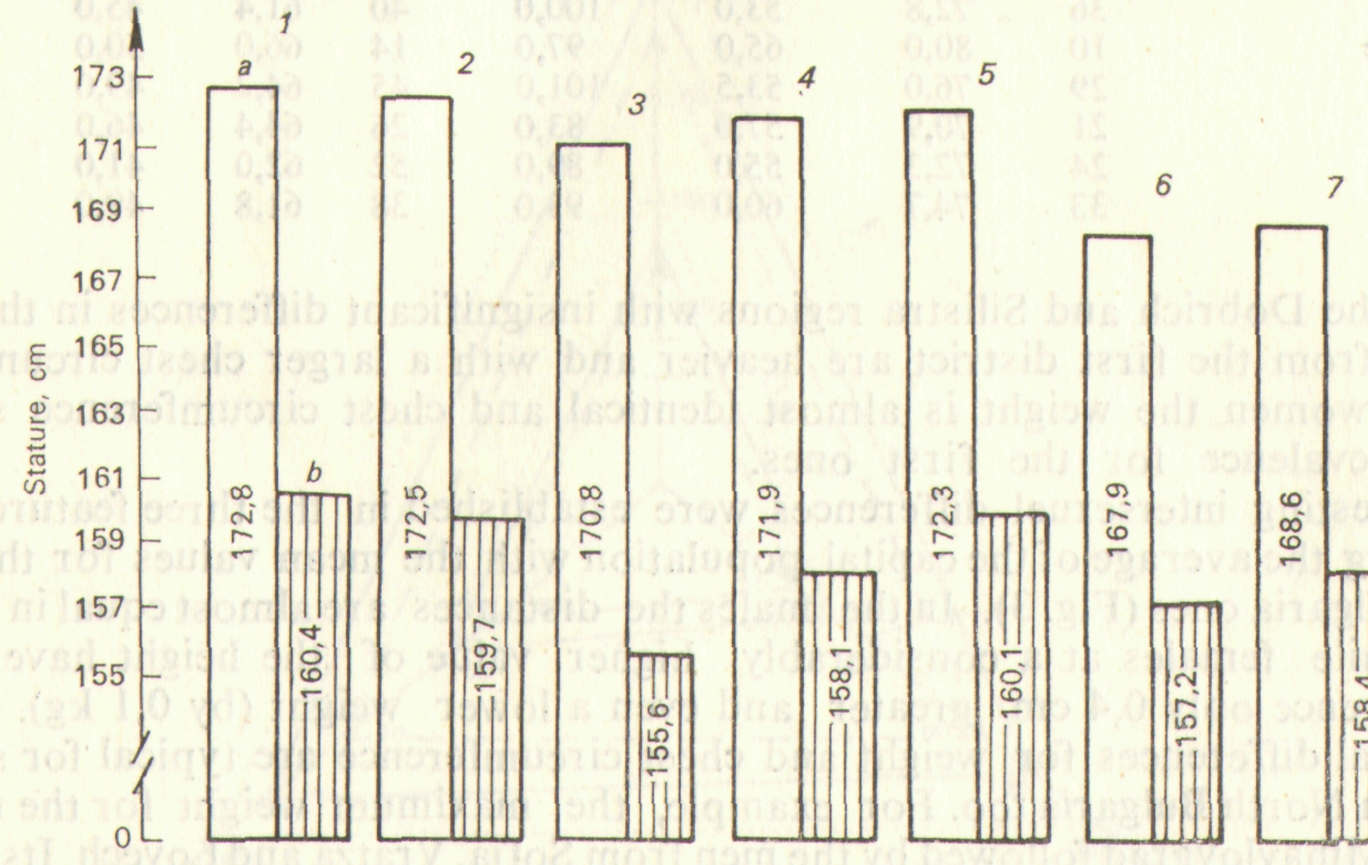


Fig. 4. Stature of the population in the Danube Plain region
a — men; *b* — women; *1* — Vidin; *2* — Lom; *3* — Nicopol; *4* — Svishtov; *5* — Russe; *6* — Tutrakan; *7* — Silistra

easily discernible. The same tendency is observed, as well in tracing the changes of the values for the height, weight and chest circumference in the settlements situated in the Danube Plain region. Especially pronounced it is found in the height of men where the difference between the extreme west (Vidin and Lom) and extreme east (Tutrakan and Silistra) is over 4 cm (Fig. 4).

The results obtained though unfinished give a clear picture of the variations of the height, weight and chest circumference found on the territory of the whole North Bulgaria. They outline the main trends in the alterations of the physical development of the population from the given regions unveiling the factors whose influence is to be sought and discussed in the final analysis of the data from the research programme.

II. Subcutaneous fat tissue

One of the priorities of the national anthropological programme is by studying the specificity of human physical development to provide information about the ratio between the hereditary component and the ecosensitivity in the anthropometric characteristics. It is anticipated that through unraveling the features of greatest reactivity important sides of the morpho-functional adaptation capacities of the organism to be shed light on under concrete conditions of life and labour. Ensuring such an information is in itself an opportunity for morpho-functional control upon

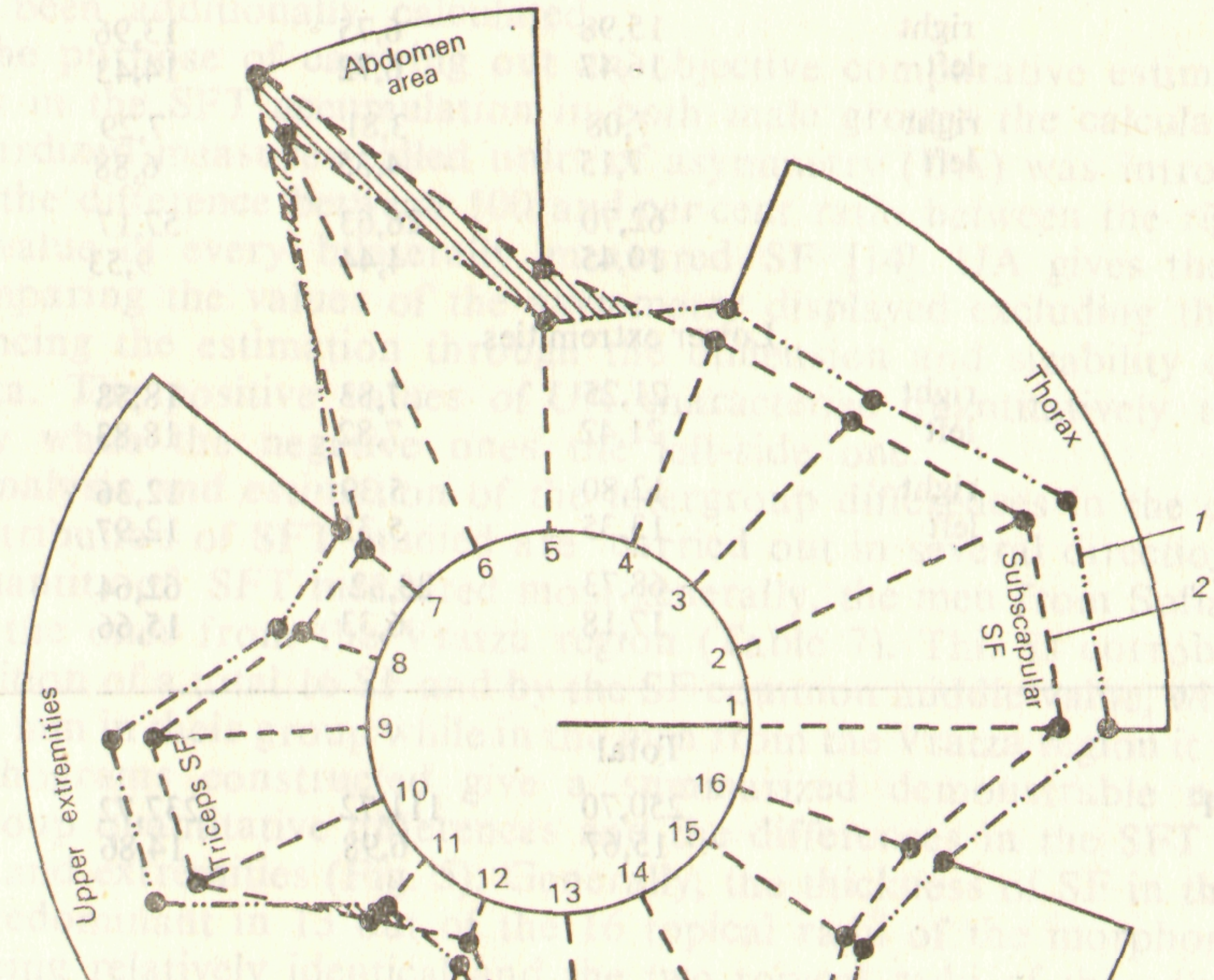


Fig. 5. Morphograms of the investigated skinfolds
1 — Sofia town; *2* — Vratza region
* The numbers in the circle correspond to the serial numbers of the skinfolds in Table 7

Table 7. Metrical data of investigated skinfolds, mm

	Skinfolds (SF)	Laterality	Sofia-town		Vratza region	
			$\bar{x}$	σ	$\bar{x}$	σ
			Thorax			
1	Subscapular	right	21,28	10,15	19,33	7,45
2		left	21,64	10,20	19,65	7,36
3	Xth rib	right	16,65	8,25	15,50	6,59
4		left	16,88	8,05	15,11	6,54
	Sum of 4 SF		76,25	35,48	69,66	26,35
	Mean SF		19,06	8,87	17,41	6,59
			Abdomen area			
5	Suprailiac		14,82	7,15	17,84	6,70
6	Abdomen		27,55	11,03	30,86	10,14
	Sum of 2 SF		42,33	17,39	48,63	15,77
	Mean SF		21,26	8,62	24,32	7,88
			Upper extremities			
7	Biceps	right	8,18	4,42	6,94	3,26
8		left	8,20	4,49	7,64	3,52
9	Triceps	right	15,98	6,75	13,96	5,03
10		left	16,47	6,72	14,43	5,18
11	Forearm	right	7,08	3,81	7,29	2,78
12		left	7,15	4,35	6,88	2,64
	Sum of 6 SF		62,70	26,63	57,17	20,08
	Mean SF		10,45	4,44	9,53	3,35
			Lower extremities			
13	Thigh	right	21,25	7,83	18,58	5,96
14		left	21,42	7,82	18,83	6,12
15	Calf	right	12,80	5,39	12,36	4,68
16		left	13,35	5,31	12,97	4,82
	Sum of 4 SF		68,73	25,32	62,64	20,21
	Mean SF		17,18	6,33	15,66	5,05
			Total			
	Sum of 16 SF		250,70	111,72	237,72	80,31
	Mean SF		15,67	6,98	14,86	4,85

Table 8. Percentage distribution of subcutaneous fat tissue

Settlement	Total $4\bar{x}$ SF	Thorax		Abdomen		Upper extremities		Lower extremities	
		$\bar{x}$	%	$\bar{x}$	%	$\bar{x}$	%	$\bar{x}$	%
Sofia	67,95	19,06	28,05	21,26	31,29	10,45	15,39	17,18	25,28
Vratza region	66,92	17,41	26,02	24,32	36,34	9,53	14,24	15,66	23,40

the physical development and health condition of various population groups with regard to the factor according to which these groups are differentiated [20, 21, 35, 36, 38]. As an illustration for obtaining biological information of this type we show preliminary results from a comparative study on the subcutaneous fat tissue (SFT) in the present work. It is known that this body ingredient is one of the most ecosensitive characteristics of the human body. In comparative investigations of SFT (interpersonal, intergroup and intersexual ones) differences can be recorded in its reactivity in two aspects — as differences in its total amount and as differences in its topic distribution over the body and extremities. Both types of differences reflect the specificity of the way and type of nutrition, type of physical activity during work, everyday life and sports, type of climate and geographical peculiarities of the environment, etc.

The comparative analysis of SFT in the present study is performed on the background of the natural geographic and urbanization differences in life conditions between two investigation sites in the country. Metric data about 9 standard skin folds (SF) along body and extremities in 234 men from the capital and 125 men from the Vratza region were used. Seven of the SF were bilaterally investigated to account for the asymmetry in the SFT topical distribution. The caliperometry is carried out after B r o z e k and K e y s [3] by the help of an original Holtain [14] caliper. The common mean SF, the averaged SFT and their per cut distribution of the SFT measured over the chest, abdomen, upper and lower extremities have been additionally calculated.

For the purpose of carrying out an objective comparative estimation of the asymmetry in the SFT accumulation in both male groups the calculation of sizeless standardized measures called units of asymmetry (UA) was introduced. They represent the difference between 100 and per cent ratio between the right side and left side value of every bilaterally measured SF [14]. UA gives the opportunity for comparing the values of the asymmetry displayed excluding the possibility for influencing the estimation through the dimension and sizability of the initial metric data. The positive values of UA characterize quantitatively the right-side asymmetry while the negative ones the left-side one.

The analysis and estimation of the intergroup differences in the quantity and topical distribution of SFT studied are carried out in several directions. With regard to quantity of SFT measured most generally, the men from Sofia have more SFT than the ones from the Vratza region (Table 7). This is corroborated both by the addition of a total 16 SF and by the SF common middle value, which is found to be 15,67 mm in their group while in the men from the Vratza region it is 14,86 mm. The morphograms constructed give a summarized demonstrable notion about the intergroup quantitative differences and the differences in the SFT distribution over body and extremities (Fig. 5). Generally, the thickness of SF in the men from Sofia is predominant in 13 out of the 16 topical radii of the morphogram in one of them being relatively identical and the two topical radii of the adbominal area show a markedly thicker SF for the males from Vratza region. For objectivization reasons of the established intergroup differences, the per cent ratio between the averaged SF for the chest, abdomen, upper and lower extremities was evaluated in such a manner, that the estimation of the metric differences between them are drawn out of one and this same initial basis (Table 8). As is seen from Fig. 6 the most considerable intergroup difference is found in the thickness of abdomen SFT. This is a body area where accumulation of SFT strongly depends on the dietary habits, active sports engagement, and the will-power of the individual.

The results obtained up to this moment clearly show that both male groups distinctly differentiate between themselves by the predilection topics for amassing greater quantities of SFT. It is obvious that this fact reflects the differences between

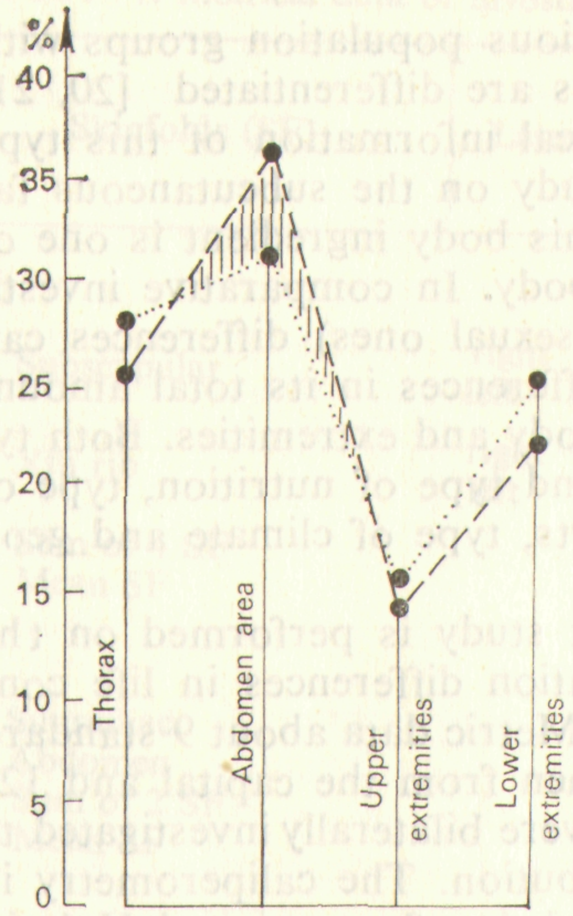


Fig. 6. Percentage distribution of the subcutaneous fat tissue (. . .) — Sofia; (— — —) — Vratza

the two studied foci in view of the dietary habits, the type and characteristics of the physical activity of the individuals in their professional labour, everyday-life labour and sports activities. An explanation of the established intergroup differences is provided by the significant ecosensitivity of the fat tissue in general which is namely defined as a functionally dependent feature. With even greater validity this explanation is true for the SFT, the latter being an important energy source for the work of the underlying musculature. An illustration of the functional dependence of SFT of the work specificity of the underlying musculature are the obtained in the present study topical differences in the SFT distribution in both male groups under investigation. As is distinctly seen from the morphogram (Fig. 5), the intergroup differences in the SF thickness are more significant in the areas covering muscles and muscle groups with a greater differentiation in the various types of physical activity (motoric activity, static efforts, weight lifting, mixed types, etc.). These are musculus triceps, the back musculature and the muscles of the thigh. In the areas over muscles and muscle groups which have a more unified and obligatory participation in human physical activity in general, such as the musculature of the forearm, partly muscules biceps, and the tibial musculature, the intergroup differences in the SFT thickness found in them are significantly smaller.

Still richer and more interesting is the information about the specificity of the intergroup differences in the distribution of SFT yielded by the assessment of the asymmetry in the thickness of the skin folds studied (Table 9). In the males from Sofia the left side values predominate in all SF i. e. the asymmetry in them is left-sided and a significant one as is observed in the corresponding UA (Fig. 7). In the males from the Vratza region the skin folds over the X-th rib and over the forearm demonstrate a right-sided asymmetry. The rest of the skin folds have displayed a left-sided asymmetry again as it is in the men from Sofia only differing by metric characteristics. In the subscapular skin folds and in the skin folds of the thigh the left-sided asymmetry is comparatively less expressed while in the skin folds of m. biceps, m. triceps and the thigh it is much better pronounced than the ones in the men from Sofia.

Table 9. Manifestation of asymmetry of the investigated skinfolds

Regions	Unit of asymmetry (UA)						
	subscapular SF	Xth rib SF	biceps SF	triceps SF	forearm SF	thigh SF	calf SF
Sofia	—1,67	—1,36	—0,24	—2,97	—0,98	—0,79	—4,12
Vratza region	—1,63	+2,58	—9,16	—3,26	+5,96	—1,33	—4,70

Note : (+) — right side; (—) — left side asymmetry.

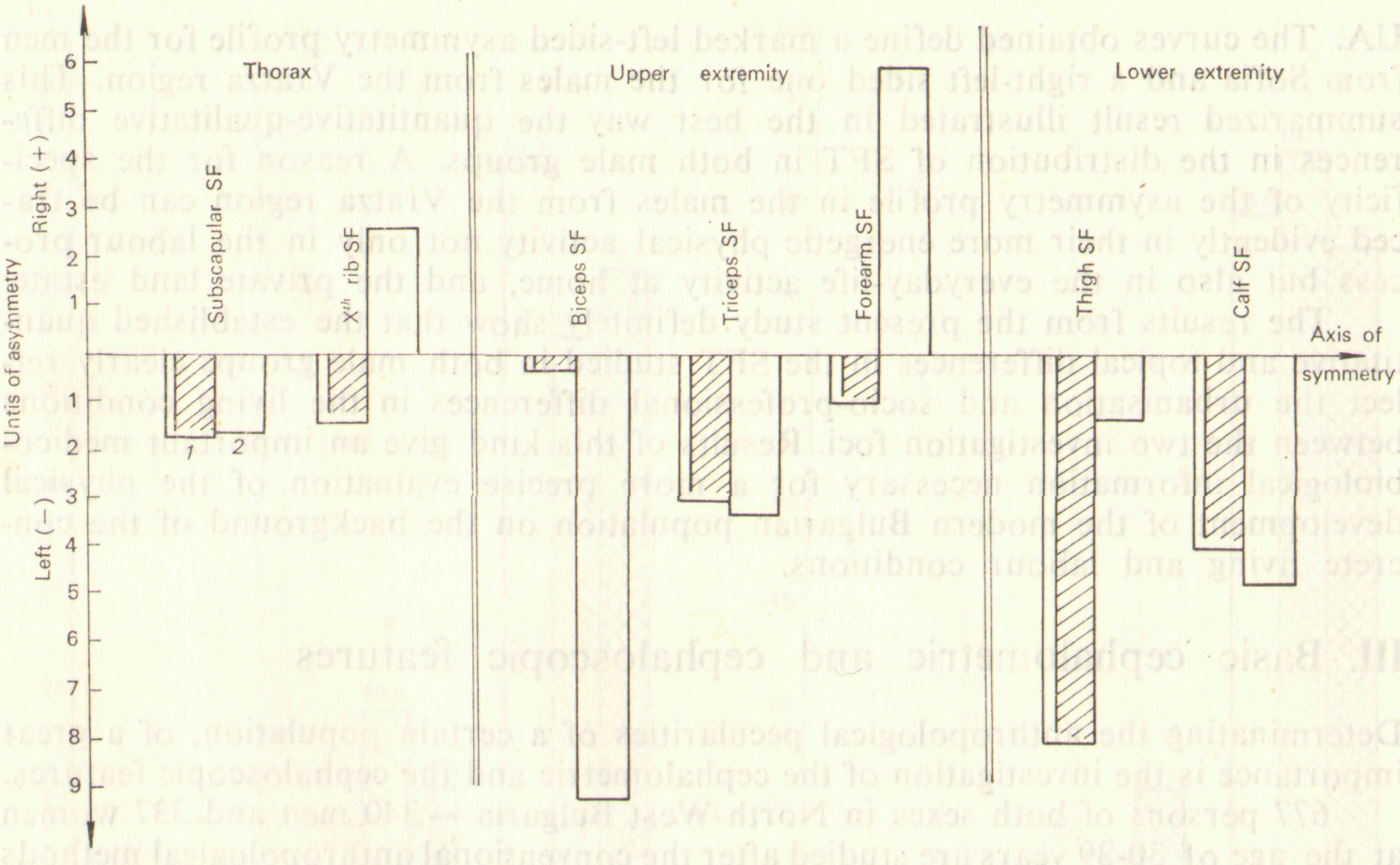


Fig. 7. Manifestation of the asymmetry of the investigated skinfolds
1 — Sofia town; *2* — Vratza region

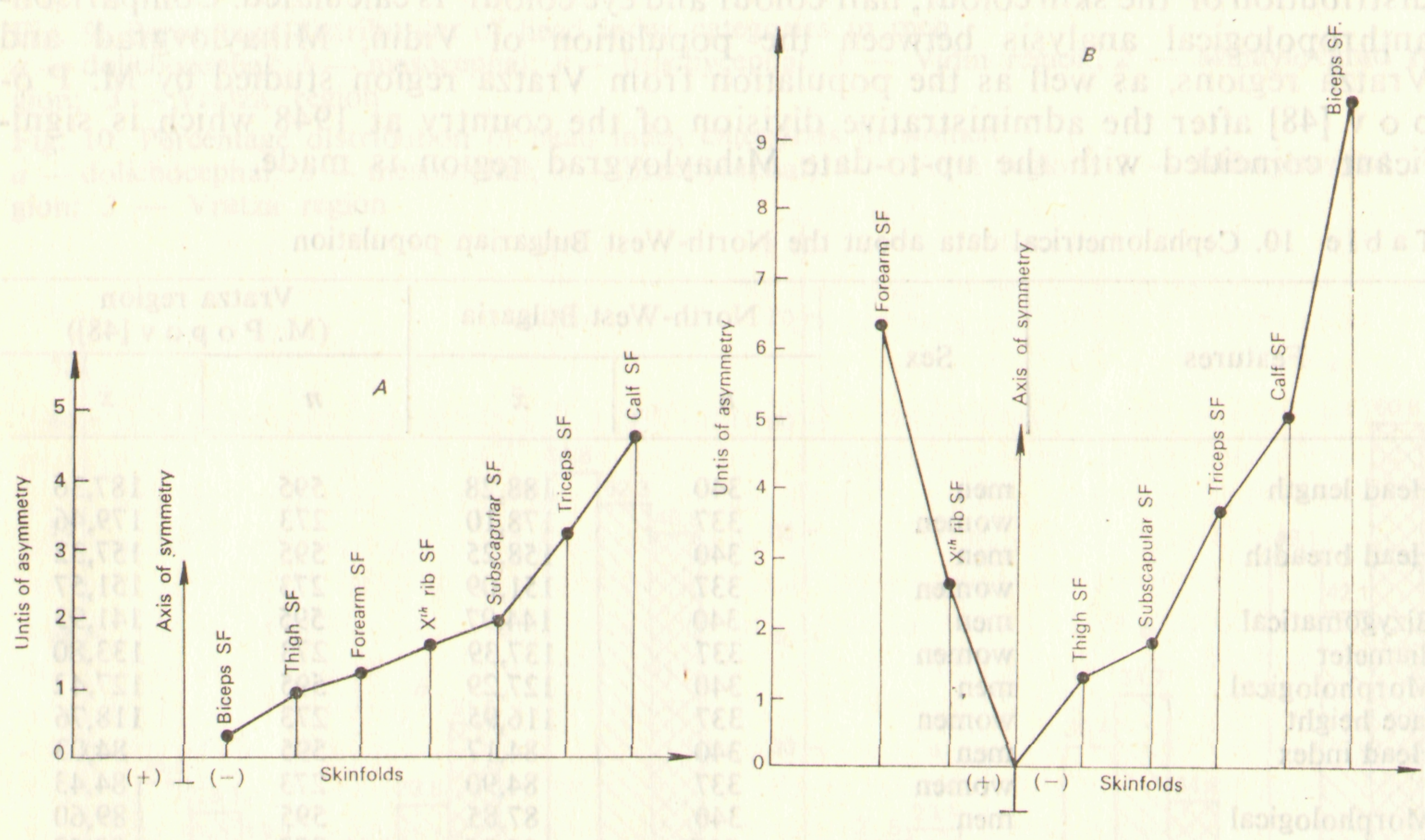


Fig. 8. Curves of the manifestated asymmetry
A — Sofia; *B* — Vratza region

The asymmetry profiles of both male groups render a summarized notion about the intergroup differences in the cases of asymmetry (Fig. 8). They have been constructed by the descending right arrangement, and the ascending for the left one of the features in the coordinate system according to the values of their

UA. The curves obtained define a marked left-sided asymmetry profile for the men from Sofia and a right-left sided one for the males from the Vratza region. This summarized result illustrated in the best way the quantitative-qualitative differences in the distribution of SFT in both male groups. A reason for the specificity of the asymmetry profile in the males from the Vratza region can be traced evidently in their more energetic physical activity not only in the labour process but also in the everyday-life activity at home, and the private land estate.

The results from the present study definitely show that the established quantitative and topical differences in the SFT studied in both male groups clearly reflect the urbanisation and socio-professional differences in the living conditions between the two investigation foci. Results of this kind give an important medico-biological information necessary for a more precise evaluation of the physical development of the modern Bulgarian population on the background of the concrete living and labour conditions.

III. Basic cephalometric and cephaloscopic features

Determinating the anthropological pecularities of a certain population, of a great importance is the investigation of the cephalometric and the cephaloscopic features.

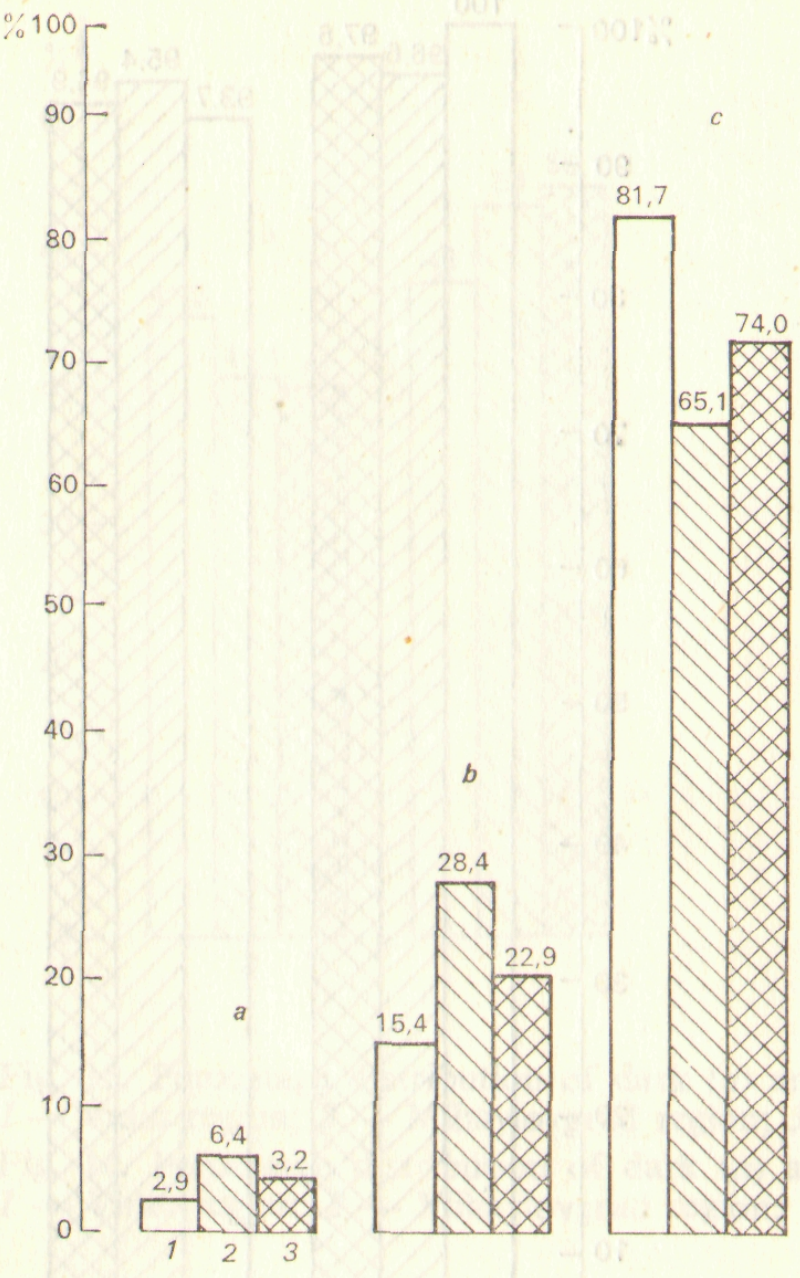
677 persons of both sexes in North-West Bulgaria — 340 men and 337 women at the age of 30-39 years are studied after the conventional anthropological methods [11, 30, 31, 48, 50]. The study includes Vidin, Mihaylovgrad and Vratza region. The following cephalometric features are examined: head length and head breadth; bizygomatical diameter and morphological face height on which basis are calculated the head index and the morphological face index (Table 10). The percentage distribution of the skin colour, hair colour and eye colour is calculated. Comparison-anthropological analysis between the population of Vidin, Mihaylovgrad and Vratza regions, as well as the population from Vratza region studied by M. P o p o v [48] after the administrative division of the country at 1948 which is significant coincided with the up-to-date Mihaylovgrad region is made.

T a b l e 10. Cephalometrical data about the North-West Bulgarian population

Features	Sex	North-West Bulgaria		Vratza region (M. P o p o v [48])	
		n	$\bar{x}$	*n*	$\bar{x}$
Head length	men	340	188,28	595	187,36
	women	337	178,10	273	179,46
Head breadth	men	340	158,25	595	157,32
	women	337	151,09	273	151,57
Bizygomatical	men	340	144,97	595	141,93
diameter	women	337	137,39	273	133,80
Morphological	men	340	127,29	595	127,42
face height	women	337	116,95	273	118,76
Head index	men	340	84,17	595	84,03
	women	337	84,90	273	84,43
Morphological	men	340	87,85	595	89,60
face index	women	337	85,25	272	88,52

Fig. 11. Percentage distribution of face morphological index categories in men →
a — euryprosop; *b* — mesoprosop; *c* — leptoprosop; *1* — Vidin region; *2* — Mihaylovgrad region; *3* — Vratza region

Fig. 12. Percentage distribution of face morphological index categories in women
a — euryprosop; b — mesoprosop; *c* — leptoprosop; *1* — Vidin region; *2* — Mihaylovgrad region; *3* — Vratza region



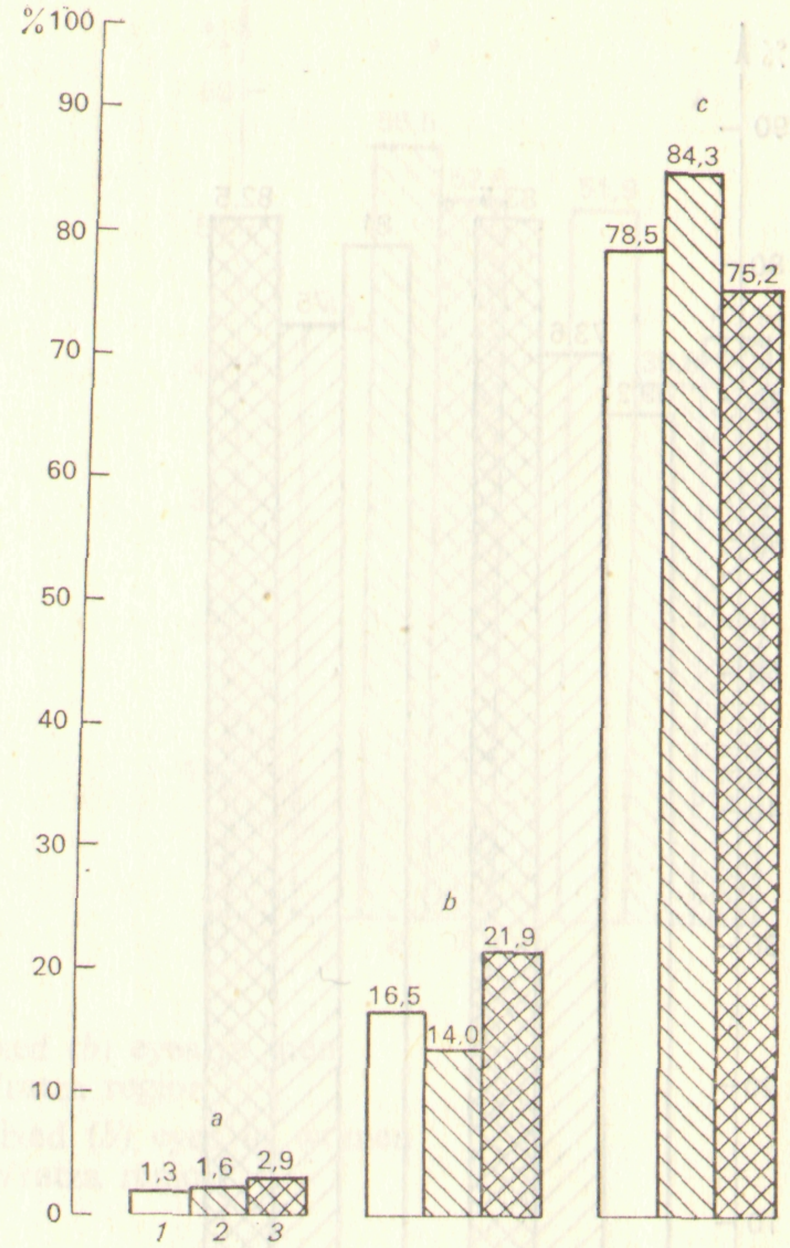


Fig. 9. Percentage distribution of head index categories in men
a — dolichocephal; *b* — mesocephal; *c* — brachycephal; *1* — Vidin region; *2* — Mihaylovgrad region; *3* — Vratza region

Fig. 10. Percentage distribution of head index categories in women
a — dolichocephal; *b* — mesocephal; c — brachycephal; *1* — Vidin region; *2* — Mihaylovgrad region; *3* — Vratza region

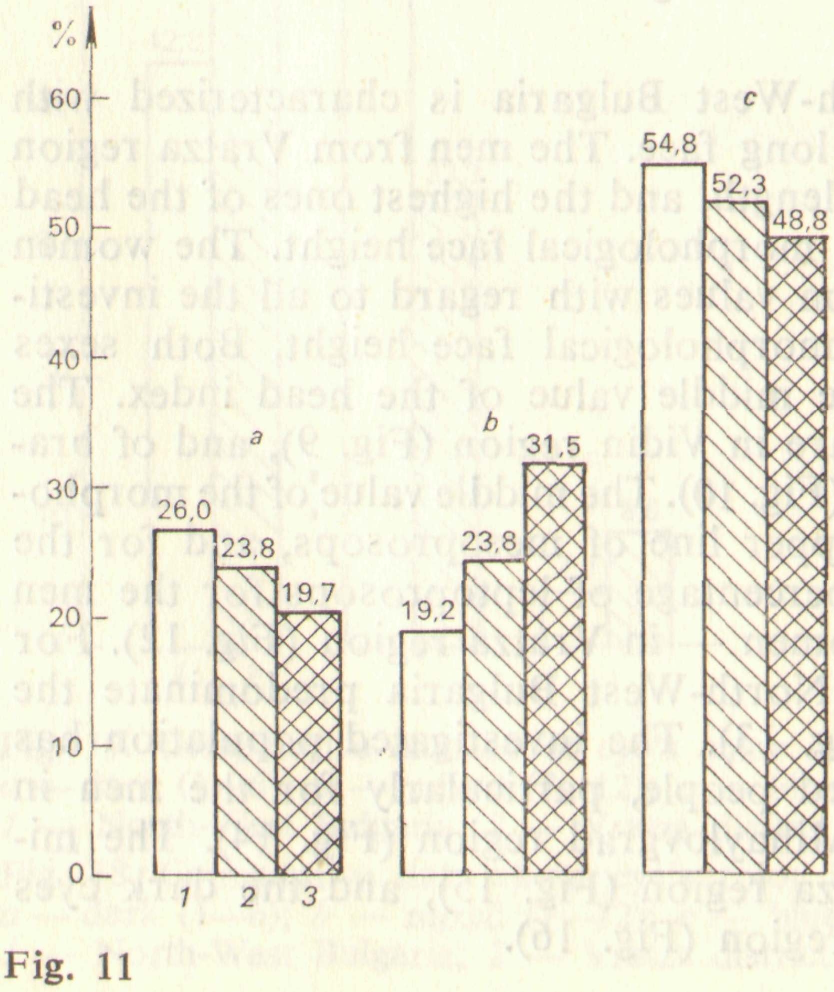


Fig. 11

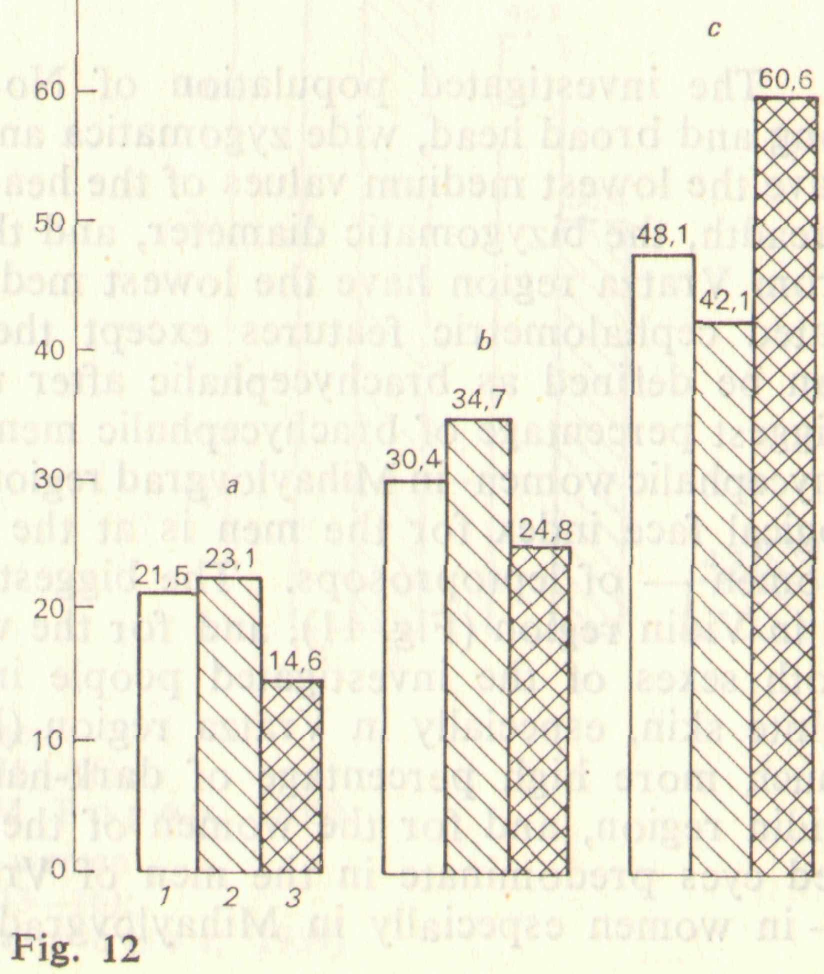
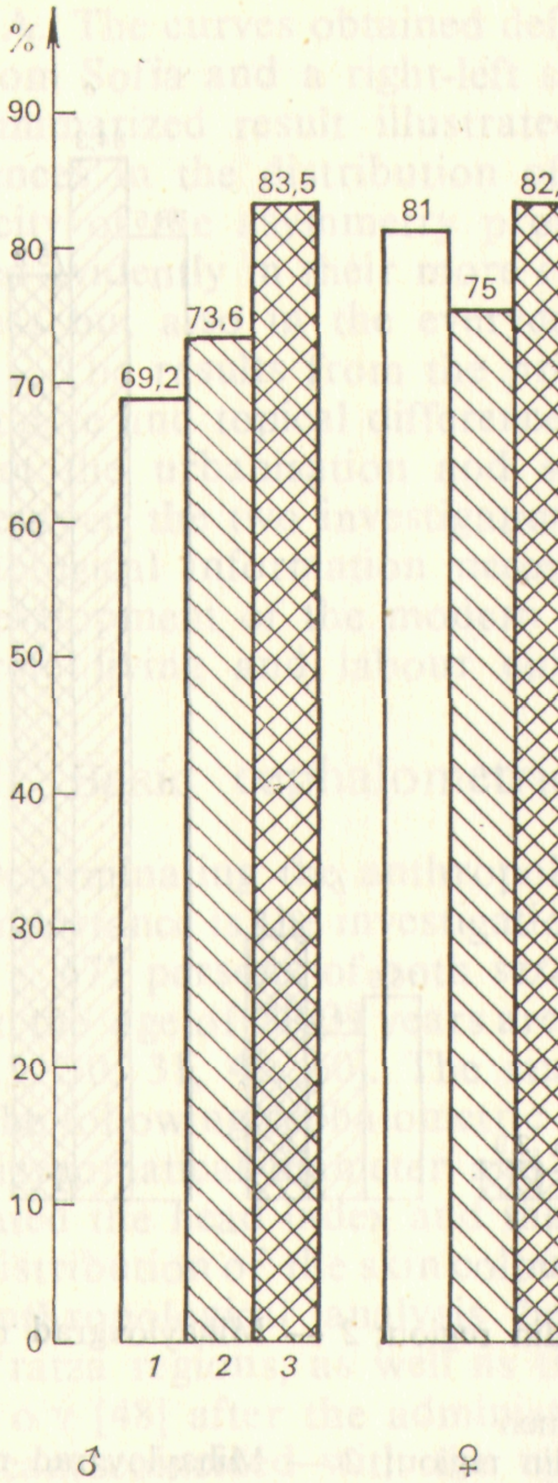


Fig. 12



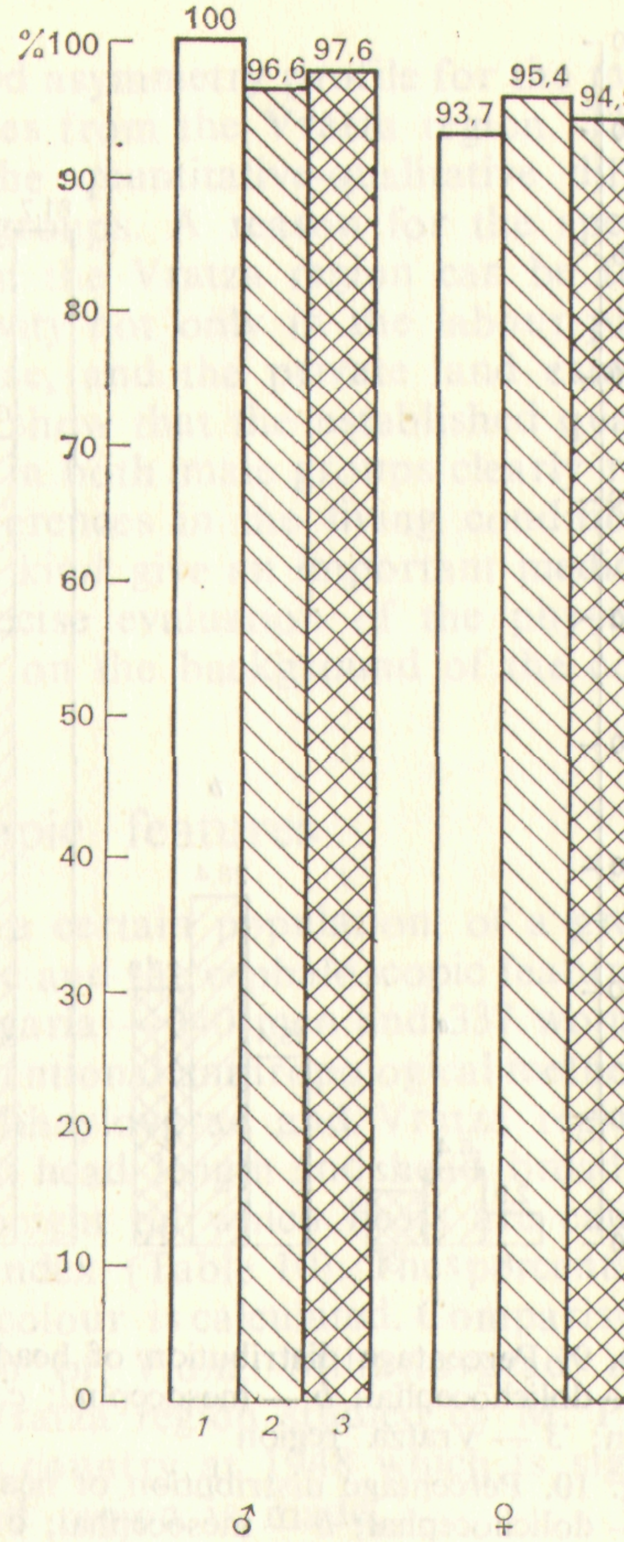
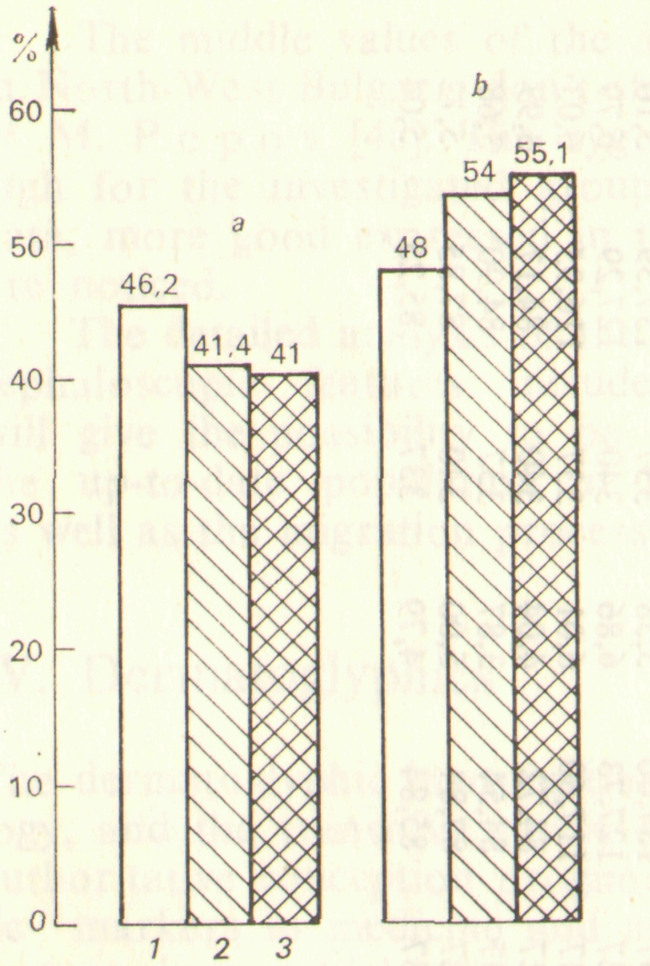


Fig. 13. Percentage distribution of fair skin
1 — Vidin region; *2* — Mihaylovgrad region; *3* — Vratza region

Fig. 14. Percentage distribution of dark hair (P—Y)
1 — Vidin region; *2* — Mihaylovgrad region; *3* — Vratza region

The investigated population of North-West Bulgaria is characterized with long and broad head, wide zygomatica and long face. The men from Vratza region have the lowest medium values of the head length, and the highest ones of the head breadth, the bizygomatic diameter, and the morphological face height. The women from Vratza region have the lowest medium values with regard to all the investigated cephalometric features except the morphological face height. Both sexes can be defined as brachycephalic after the middle value of the head index. The biggest percentage of brachycephalic men are in Vidin region (Fig. 9), and of brachycephalic women–in Mihaylovgrad region (Fig. 10). The middle value of the morphological face index for the men is at the upper line of mesoprosops, and for the women — of leptoprosops. The biggest percentage of leptoprosops for the men is in Vidin region (Fig. 11), and for the women — in Vratza region (Fig. 12). For both sexes of the investigated people in North-West Bulgaria predominate the white skin, especially in Vratza region (Fig. 13). The investigated population has much more high percentage of dark-haired people, particularly for the men in Vidin region, and for the women of the Mihaylovgrad region (Fig. 14). The mixed eyes predominate in the men of Vratza region (Fig. 15), and the dark eyes — in women especially in Mihaylovgrad region (Fig. 16).



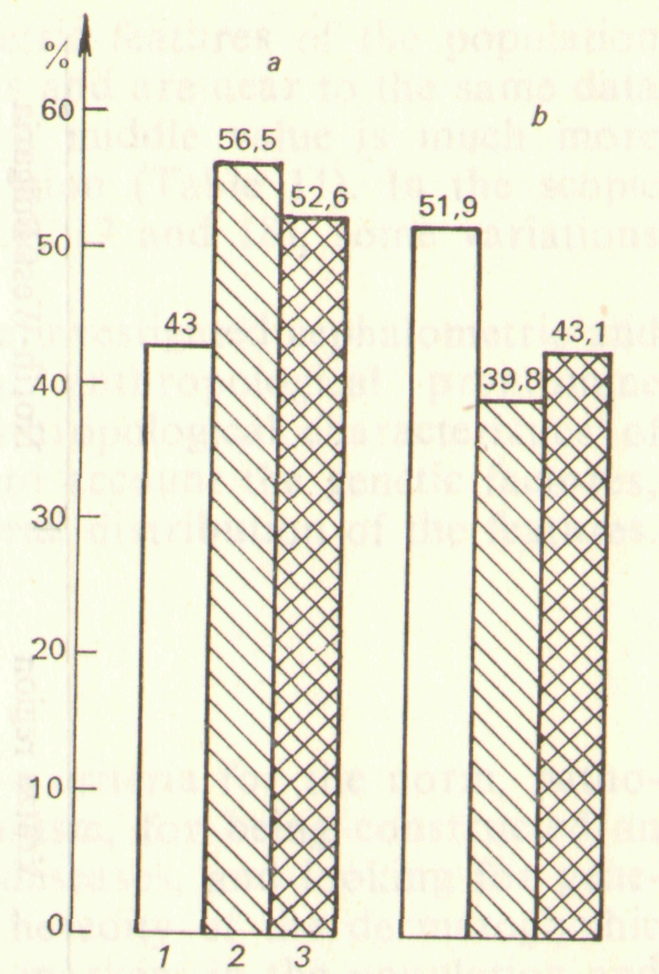
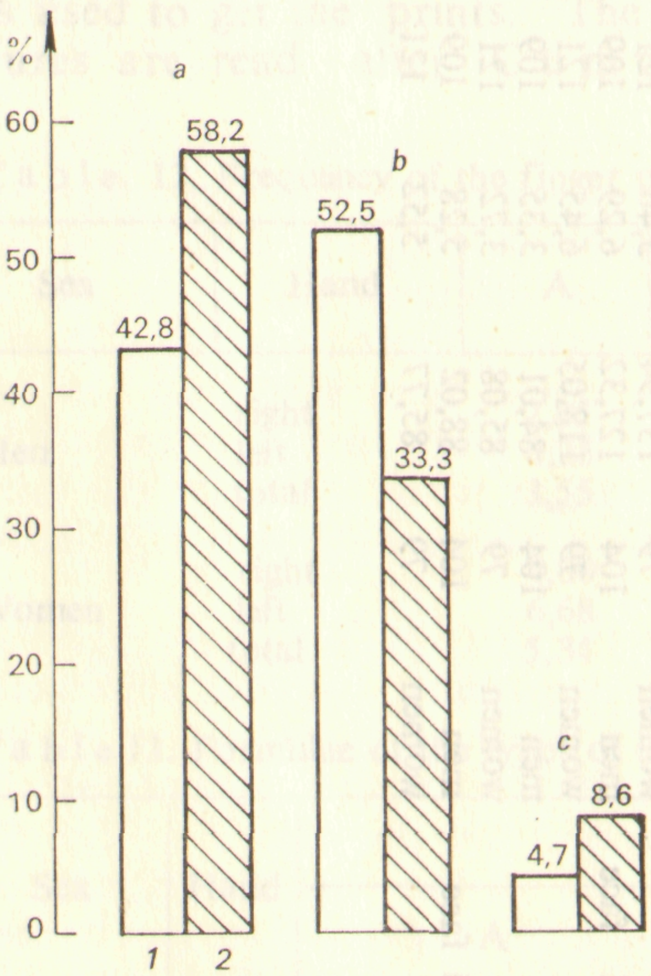


Fig. 15. Percentage distribution of dark (*a*) and mixed (*b*) eyes in men
1 — Vidin region; *2* — Mihaylovgrad region; *3* — Vratza region
Fig. 16. Percentage distribution of dark (*a*) and mixed (*b*) eyes in women
1 — Vidin region; *2* — Mihaylovgrad region; *3* — Vratza region



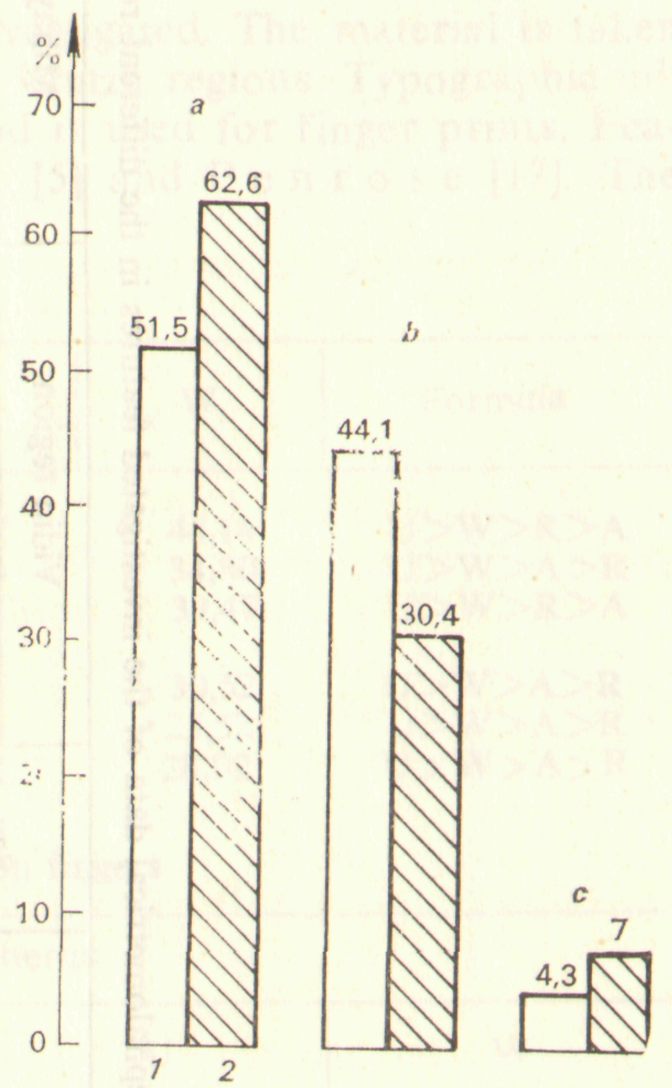


Fig. 17. Comparative data about eye's color in men
a — dark (1—6); *b* — mixed (7—12); *c* — blue (13—16);
1 — North-West Bulgaria; *2* — Vratza district (M. P o p o v, 1959)
Fig. 18. Comparative data about eye's color in women
a — dark (1—6); *b* — mixed (7—12); *c* — blue (13—16);
1 — North-West Bulgaria; *2* — Vratza district (M. P o p o v, 1959)

T a b l e 11. Cephalometrical data of the investigated features in the different regions

Features	Sex	Vidin region			Mihaylovgrad			Vratza region			North-West Bulgaria		
		n	$\bar{x}$	S	n	$\bar{x}$	S	n	$\bar{x}$	S	n	$\bar{x}$	S
Head length	men	104	188,40	5,80	109	188,95	7,03	127	187,61	6,62	340	188,28	6,52
	women	79	178,64	6,24	121	178,09	5,68	137	177,80	6,23	337	178,10	6,04
Head breadth	men	104	158,19	5,91	109	157,83	6,00	127	158,65	5,99	340	158,25	6,00
	women	79	151,72	5,67	121	151,71	4,77	137	150,15	5,45	337	151,09	5,27
Bizygomatical diameter	men	104	144,89	5,11	109	144,44	6,20	127	145,49	6,10	340	144,97	5,85
	women	79	137,94	5,46	121	137,47	4,23	137	137,00	5,58	337	137,39	5,10
Morphological face height	men	104	127,32	6,29	109	126,74	7,16	127	127,73	6,86	340	127,29	6,79
	women	79	118,05	6,45	121	115,49	5,77	137	117,60	6,01	337	116,95	6,03
Head index	men	104	84,01	3,35	109	83,67	4,47	127	84,72	4,04	340	84,17	3,99
	women	79	85,08	3,72	121	85,18	3,42	137	84,54	3,87	337	84,90	3,68
Morphological face index	men	104	88,02	5,28	109	87,71	4,93	127	87,84	5,00	340	87,85	5,12
	women	79	85,77	5,52	121	84,24	4,94	137	85,84	4,79	337	85,25	5,04

The middle values of the analysed cephalometric features of the population in North-West Bulgaria don't show a big variations and are near to the same data of M. P o p o v [48]. The zygomatica wide, which middle value is much more high for the investigated groups, makes an exception (Table 11). In the scopic data, more good expressed in the eyes colour (Fig. 17 and 18), some variations are noticed.

The detailed analysis of the final results of the investigated cephalometric and cephaloscopic features included in the National anthropological programme will give the possibility to be cleared up the anthropological characteristics of the up-to-date population in Bulgaria taking into account the genetic factores, as well as the migration processes, and the territorial distribution of the features.

IV. Dermatoglyphics

The dermatoglyphic investigations can be used as a criteria for the norm, pathology, and the transitive status of the human organism, for being constructed an authoritative conception prognosticating different deseases, and looking for genetic markers in medicine and anthropology. The heredity of the dermatoglyphic features is very high. They can be used as genetic markers in the population and medical genetics. To be estimated this fact, however, it's necessary at first to be known the dermatoglyphic characterization of the healthy population.

The aim of this study is to be given a common dermatoglyphic characteristics of the population in North-West Bulgaria, as a part of the whole dermatoglyphic characteristics of the population in Bulgaria.

Finger and palm prints of 262 adult Bulgarians from both sexes (127 men and 135 women) at the age of 30-39 years are investigated. The material is taken from 18 settlements in Vidin, Mihaylovgrad and Vratza regions. Typographic ink is used to get the prints. The rotatory method is used for finger prints. Features are read after C u m m i n s, M i d l o [5] and P e n r o s e [17]. The

T a b l e 12. Frequency of the finger papillar patterns

Sex	Hand	A	R	U	W	Formula
Men	right	2,85	5,54	47,47	44,14	U>W>R>A
	left	4,25	3,31	57,64	34,80	U>W>A>R
	total	3,55	4,02	52,56	39,47	U>W>R>A
Women	right	4,00	2,37	63,11	30,52	U>W>A>R
	left	6,68	2,67	65,13	25,52	U>W>A>R
	total	5,34	2,52	64,12	28,02	U>W>A>R

T a b l e 13. Formulae of the types of the papillar patterns on fingers

Sex	Hand	Patterns			
		A	R	U	W
Men	right	II>III>I>IV=V	II>III=IV	V>III>I>IV>II	IV>I>II>III>V
	left	II>III>I>IV>V	II>III>I	V>III>I>IV>II	IV>II>I>III>V
Women	right	II>III>V>I	II	V>III>I>IV>II	IV>I>II>III=V
	left	II>III>I>V	II>I=III>V	V>III>IV>I>II	IV>II>I>III>V

Table 14. Distribution of the papillar patterns on fingers — separately

Finger of hand	Type of patterns (men)				
	A	R	U	W	Formulae
$Right_1$	2,36	0	45,67	51,97	W>U>A
$Right_2$	5,51	24,41	25,20	44,88	W>U>R>A
$Right_3$	4,80	1,60	60,00	33,60	U>W>A>R
$Right_4$	0,79	1,59	29,36	68,25	W>U>R>A
$Right_5$	0,79	0	77,16	22,05	U>W>A
$Left_1$	2,36	0,79	59,05	37,80	U>W>A>R
$Left_2$	11,02	13,39	31,50	44,09	W>U>R>A
$Left_3$	5,51	2,36	64,57	27,56	U>W>A>R
$Left_4$	1,57	0	50,40	48,03	U>W>A
$Left_5$	0,79	0	82,67	16,54	U>W>A

alternative statistical analysis is used. The T-criterion of Student $p<0,05$ is used for a bilateral and intersexual comparisons.

From the finger papillar patterns (Table 12), the ulnar loops (U) in men on both hands are found most often, followed by the whorl patterns (W). The frequency of arches (A) on the right hand are least, and the radial loops (R) on the left hand show the same tendencies. The formulae for the frequency of the total finger papillar patterns in men is U>W>R>A. In 8 cases (6,30%) there are whorls on all the fingers of both hands, and in 6 cases (4,72%) — ulnar loops. No men has arches on all ten fingers.

The results for the frequency of the papillar patterns in women are the same in commonly. In women most often are the ulnar loops followed by the whorls. At the third place in contrast to the men are the arches in the women on both hands, followed by the radial loops. The formulae of the papillar patterns on both hands is: U>W>A>R. Whorls and arches on all 10 fingers didn't found in women, and ulnar loops was found in 9 cases (6,67%).

The bilateral comparison shows that the whorls are with more high frequency on the right hands, than on the left ones in both sexes, but the difference is statistically significant in men ($p<0,05$). The ulnar loops in men are found more often on the left hand ($p<0,05$), while such a difference almost missed in women. Significant bilateral differences for the other two patterns were not found.

Comparing the frequency of the papillar patterns in both sexes, we can say that more frequent are the whorls in men, and the ulnar loops in women ($p<0,05$).

The data about the frequency of the finger papillar patterns follow the same regularity as the investigations from another authors about Bulgarian population samples [19, 45, 51].

Two kinds of formulae are worked out about the distribution of the papillar patterns on the fingers. The frequency of every type papillar patterns separately for the right and the left hand in both sexes are pointed at the first type of the formulae (Table 13). The arches and the radial loops are more frequent for the II-nd fingers, the ulnar loops — for the V-th fingers, and the whorls — for the IV-th fingers. The frequency of the different patterns on the separate fingers are pointed at the second type of the formulae (Table 14). Different variations can be seen between the separate fingers, as well as between the right and the left hands, and the men and women. The comparison between the finger formulae and the common formulae about the frequency of the papillar patterns in men shows that on the right hand (common formulae U>W>R>A) there is no similarity for the separate fingers, but for the left hand (common formulae U>W>A>R) the coincidence

Type of patterns (women)				
A	R	U	W	Formulae
0,74	0	63,70	35,56	U>W>A
12,59	11,85	40,74	34,81	U>W>A>R
5,18	0	79,26	15,56	U>W>A
0	0	48,89	51,11	W>U
1,48	0	82,96	15,56	U>W>A
5,93	1,48	61,48	31,11	U>W>A>R
17,04	9,63	38,52	34,81	U>W>A>R
8,89	1,48	73,33	16,30	U>W>A>R
0	0	63,70	36,30	U>W
1,49	0,75	88,80	8,96	U>W>A>R

missed only for the II-nd finger. The coincidence with common formulae in women (right hand, left hand U>W>A>R) exists for every finger of both hands with the exception of the IV-th finger of the right hand. The results pointed out in Table 13 and Table 14 show that the analysis of the finger patterns frequency must be done separately for each hand and each finger to be understood better the regularity of their distribution.

The mathematical expression of the finger papillar patterns' frequency are the indexes. That's why the indexes of Dankmeijer and Poll have more high values in women, and the Furuhata and the delta-index are higher in men (Table 15). This differences are due to the different frequences of the papillar patterns in both sexes. Analogus to this intersex differences are spoken about from another authors [45, 51]. The values of the Dankmeijer index are higher in the studies of T o r n j o v a - R a n d e l o v a [51] and K a r e v [45] (respectively — ♂ — 12,04, ♀ —

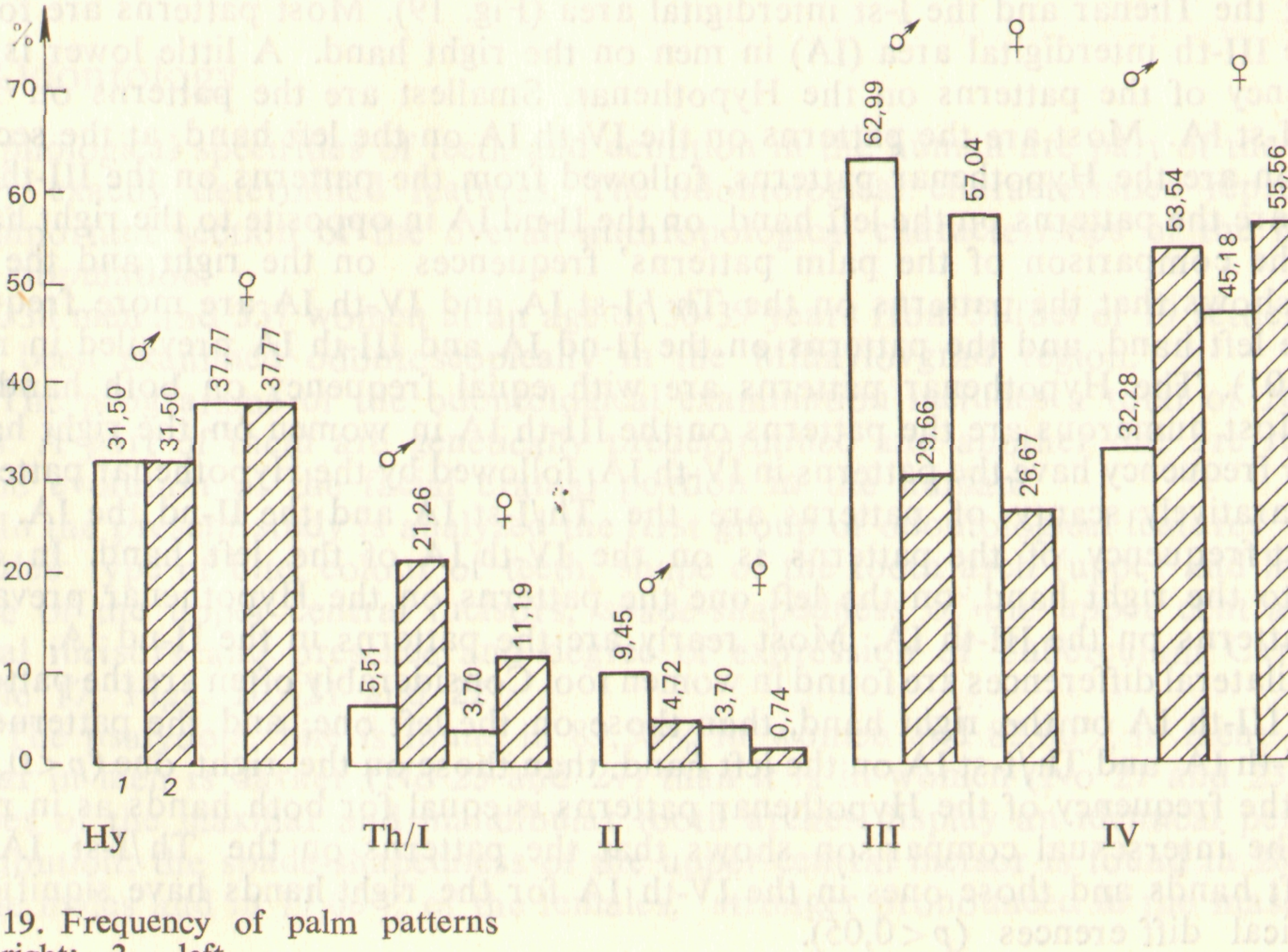


Fig. 19. Frequency of palm patterns
1 — right; 2 — left

Table 15. Index characterization of finger papillar patterns

Sex	Dankmeijer			Poll			Furuhata			Delta index		
	right	left	total	right	left	total	right	left	total	right	left	total
Men	6,46	12,21	8,99	5,38	6,97	6,24	83,28	57,10	69,27	14,13	13,06	13,59
Women	13,11	26,18	19,64	6,11	9,85	7,98	46,61	37,64	42,12	12,65	11,88	12,26

Table 16. Frequency of the type patterns on Hypothenar

Type	Men			Women		
	right hand	left hand	total	right hand	left hand	total
A^u	51,18	55,11	53,13	37,04	42,22	39,63
A^c	12,60	11,81	12,20	22,96	18,52	20,74
A^r	4,72	0,79	2,76	2,22	1,48	1,85
L^u	11,02	7,09	9,06	7,41	8,89	8,15
L^c	3,15	0,79	1,97	3,70	0,74	2,22
L^r	11,81	18,11	14,96	20,00	22,22	21,11
W+S	4,72	3,15	3,94	3,70	0,74	2,22
L^r/L^u	—	1,57	0,79	0,74	2,96	1,85
L^r/A^c	0,79	—	0,40	1,48	1,48	1,48
L^r/T	—	—	—	0,74	0,74	0,74
L^u/A^c	—	0,79	0,40	—	—	—
V	—	0,79	0,40	—	—	—

24,53; ♂ — 11,43, ♀ — 16,29), which is due to the minimum differences in the frequency of the arches and the whorls of the investigated groups.

The frequency of the palm patterns, the type of the Hypothenar patterns and the axial triradius from the palmoscopy are studied.

The frequency of the patterns on the six areas of the palm are analysed combining the Thenar and the I-st interdigital area (Fig. 19). Most patterns are found on the III-th interdigital area (IA) in men on the right hand. A little lower is the frequency of the patterns on the Hypothenar. Smallest are the patterns on Thenar / I-st IA. Most are the patterns on the IV-th IA on the left hand, at the second position are the Hypothenar patterns, followed from the patterns on the III-th IA. Least are the patterns on the left hand, on the II-nd IA in opposite to the right hand.

The comparison of the palm patterns' frequences on the right and the left hand shows that the patterns on the Th / I-st IA and IV-th IA are more frequent on the left hand, and the patterns on the II-nd IA and III-th IA prevailed in right ($p < 0,01$). The Hypothenar patterns are with equal frequency on both hands.

Most numerous are the patterns on the III-th IA in women on the right hand. Lower frequency have the patterns in IV-th IA, followed by the Hypothenar patterns. Comparatively scanty of patterns are the Th/I-st IA and the II-nd the IA. The highest frequency of the patterns is on the IV-th IA of the left hand. In contrast to the right hand, on the left one the patterns on the Hypothenar prevailed the patterns on the III-th IA. Most rearly are the patterns in the II-nd IA.

Bilateral differences are found in women too. Considerably often are the patterns in the III-th IA on the right hand, than those on the left one, and the patterns on the IV-th IA and Th/I-st IA on the left hand, than those on the right one ($p < 0,05$). Here the frequency of the Hypothenar patterns is equal for both hands as in men.

The intersexual comparison shows that the patterns on the Th/I-st IA on the left hands and those ones in the IV-th IA for the right hands have siqnificant statistical differences ($p < 0,05$).

It can be said, in general, that the bilateral differences prevailed to the intersexual ones in all palm area instead of the Hypothenar.

The Hypothenar (Hy) is the richest and the multiformed from all the palm areas (Table 16). From all the patterns, on the Hy most frequently in both hands and both sexes are the ulnar arches (A^u) and from the real patterns — the radial loops (L^r) followed by the ulnar opened loops (L^u). The comparison between the two hands didn't show significant differences ($p > 0{,}05$).

A particular attention deserves one of the very rear Hypothenar pattern, namely, the radial arch (A^r). G e i p e l [6] call it "classic arch pattern". G y e n i s [9] says that it isn't a separate pattern, but only a variation of the radial arch. Radial arch are found in both sexes frequently on the right hands in our investigation. By the literature [9] the frequency of this Hypothenar patterns for the European populations is 0,2-2,0%.

The analysis of the axial triradii coincided with those in the literature. In the healthy populations, in the nations all over the world, there is only one triradius — t (50-75%). The intermedial triradius (t′) is rear (10-20%), but more rear is the central triradius (t″), and the presence of two or three triradii. In our material, the most numerous is the carpal axial triradius (t) in both sexes and both hands (♂ — 62,99%, ♀ — 61,48%); on the second place with more lower frequency is the intermedial triradius (t′) (♂ — 17,72%, ♀ — 21,11%). The central triradius (t″) is very rear (♂ — 2,36%, ♀ — 4,07%). Statistical significant bilateral and intersexual differences are missing.

The dermatoglyphic characteristics is a part of the anthropological characterization. The analysis of the dermatoglyphic investigated persons for the country — total 2571 (1221 men, 1350 women) will help the presentation of a common dermatoglyphic characteristic of the population in Bulgaria. The importance of the dermatoglyphical status has two basic aspects — on the one hand, in anthropological and genetic-population aspect, and on the other hand, they can be used as a basis for a comparison and an interpretation of the results from different clinical deseases.

V. Odontology

Morphological specifities of teeth and dentition in the human are part of the genetically exactly determined features. The odontological characteristics represents an important section of the overall anthropological characteristics of the Bulgarian population.

338 men and 337 women at an age of 30-39 years from 31 foci of 19 settlements have been examined odontoscopically in the Mihaylovgrad region.

The programme of the odontological examination includes a total of 26 features. A part of them are genetically predetermined and another one are related to the evolution of the facial cranial portion in the human.

In the present study is analyzed the first group of odontological features which includes: type of bite, colour of teeth, shape of the tooth arch (upper and lower), shape of the upper central incisors, spade-shapedness of the upper central and lateral incisors and presence and degree of expression of Tuberculum Carabelli (Table 17, Figs. 20, 21 and 22).

The psalydont bite is found in 89,50% in women and 82,00% in men; tooth colour in men is darker (No 25 and 27) than it is in women (No 21 and 23); the shapes of the maxillar and mandibular tooth arches display an identical per cent distribution; the spade-shapedness of the upper central incisor is found in 28,50% of the males and in 17,60% of the females, stronger pronounced in the masculine

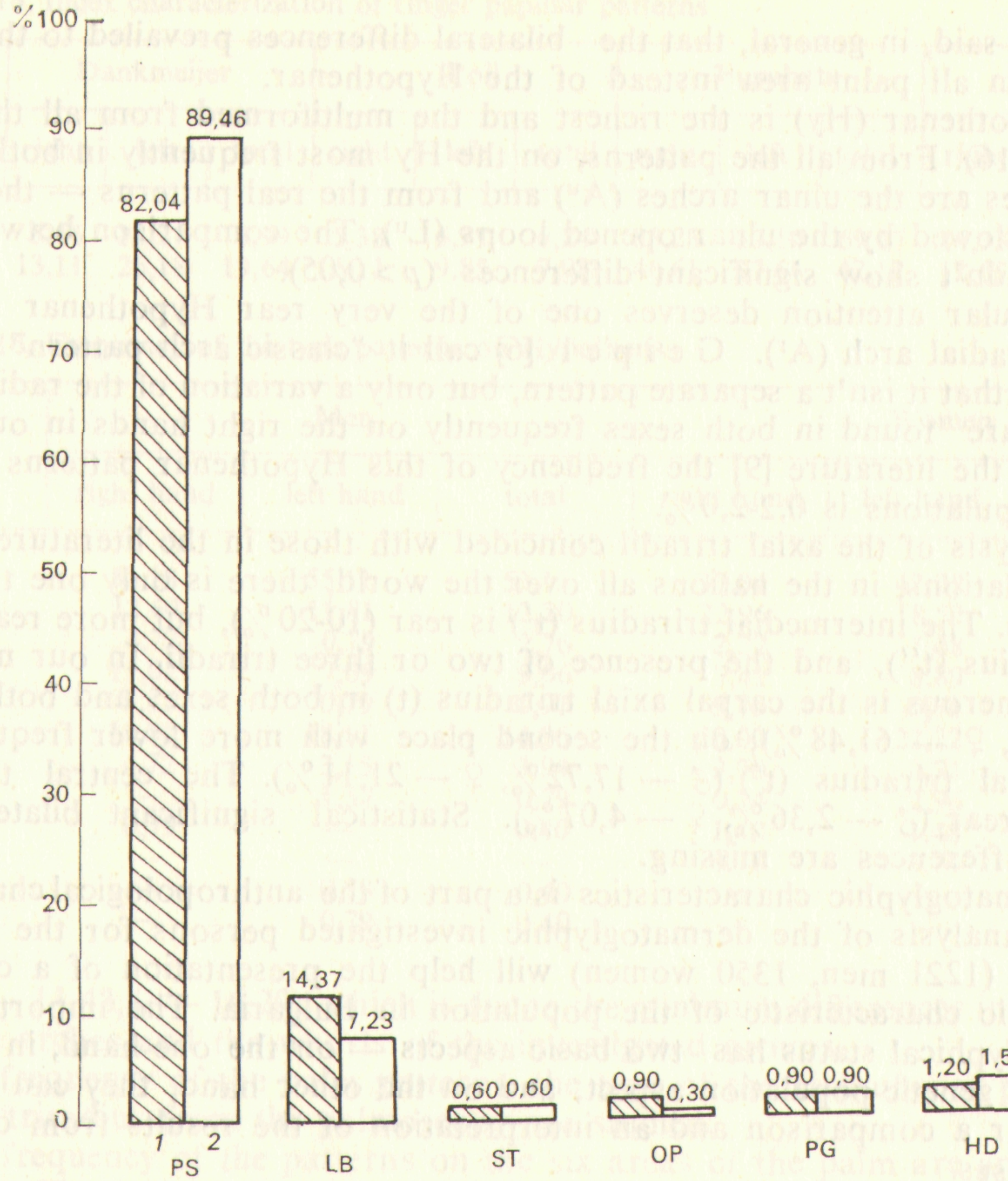


Fig. 20. Percentage distribution of bite type in men (*1*) and women (*2*)

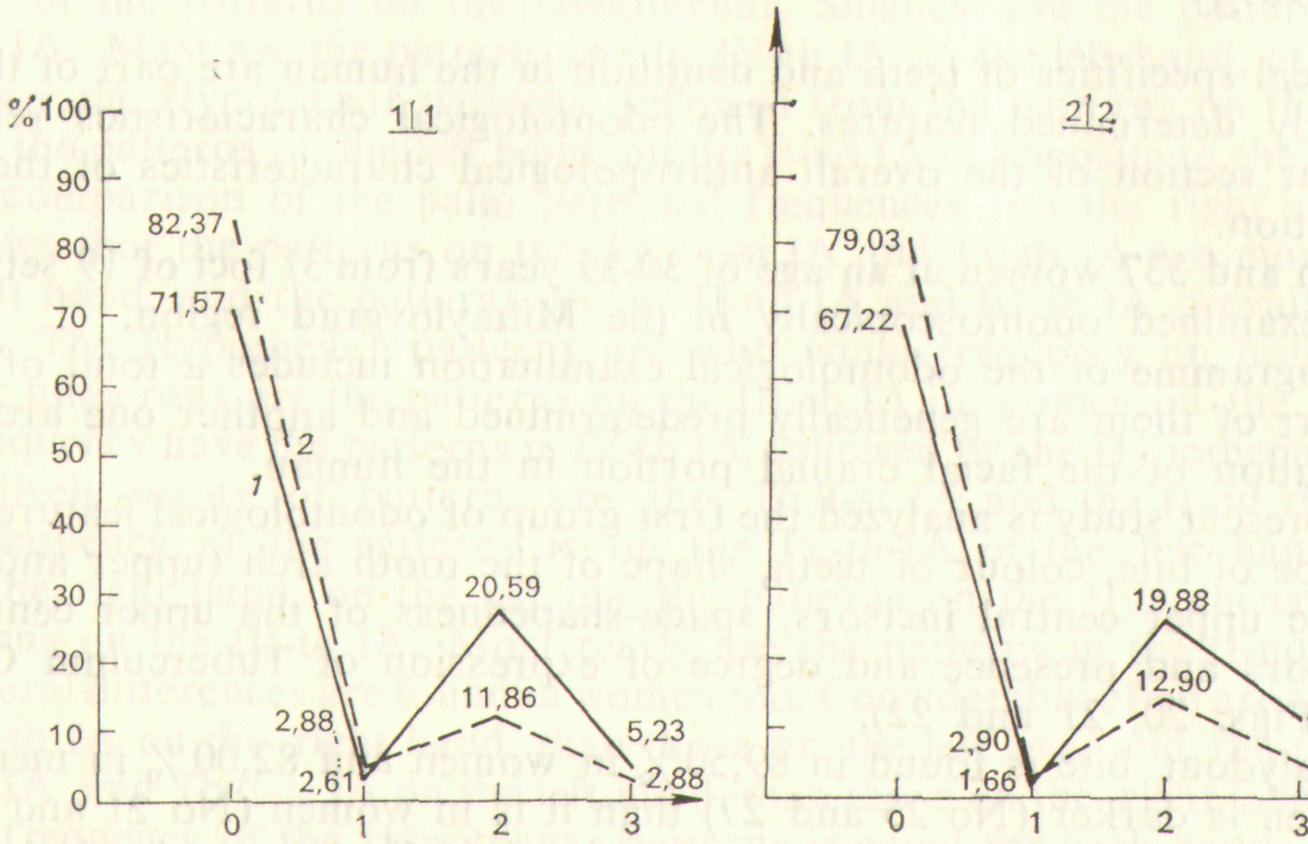


Fig. 21. Percentage distribution of shovel shape in the upper incisores
1 — men; *2* — women

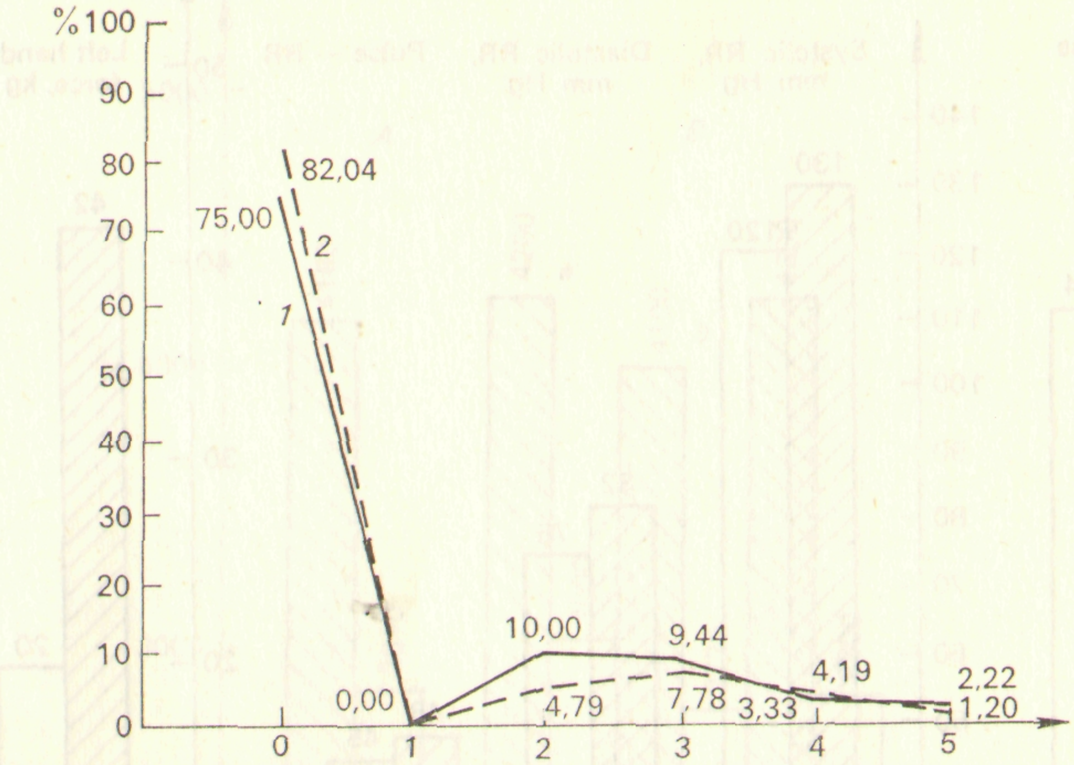


Fig. 22. Percentage distribution of Tuberculum Carabelli in the first upper molares
1 — men; *2* — women

T a b l e 17. Frequency of teeth shade and forms of processus alveolaris maxillae and mandibulare *and forms of the upper central incisores*

Features		Men		Women	
		n	%	*n*	%
Colour	05	1	0,29	2	0,60
Shade by Duracryl	07	1	0,29	—	
SPOFA, Dental Praha	19	—		1	0,29
	21	57	16,91	120	35,61
	23	81	24,03	135	40,06
	25	92	27,30	65	19,29
	27	71	21,07	13	3,86
	39	1	0,29	—	—
	41	10	2,97	1	0,29
	43	14	4,15	—	
	45	10	2,97	—	—
Form of arcus	1	42	12,61	39	11,89
alveolaris maxillae	2	237	71,17	239	72,86
	3	26	7,81	29	8,84
	4	28	8,41	21	6,40
Form of arcus	1	9	2,96	8	2,42
alveolaris mandibulae	2	248	74,03	230	72,42
	3	51	15,22	59	17,88
	4	27	8,06	24	7,28
Form of the upper central	1	161	50,95	171	53,94
incisores	2	94	29,75	70	22,08
	3	61	19,30	76	23,97

sex; the spade-shapedness of the lateral incisor repeats the same tendency — 32,80% for men and 20,90% for women; the Tuberculum Carabelli is reared in 25,00% of the men and 17,90% in women.

It is quite clear judging from the data presented that the permanent dentition in women is more regularly arranged than it is in men. The spade-shapedness in the males significantly exceeds the frequency (by 11 per cent) and the degree of expres-

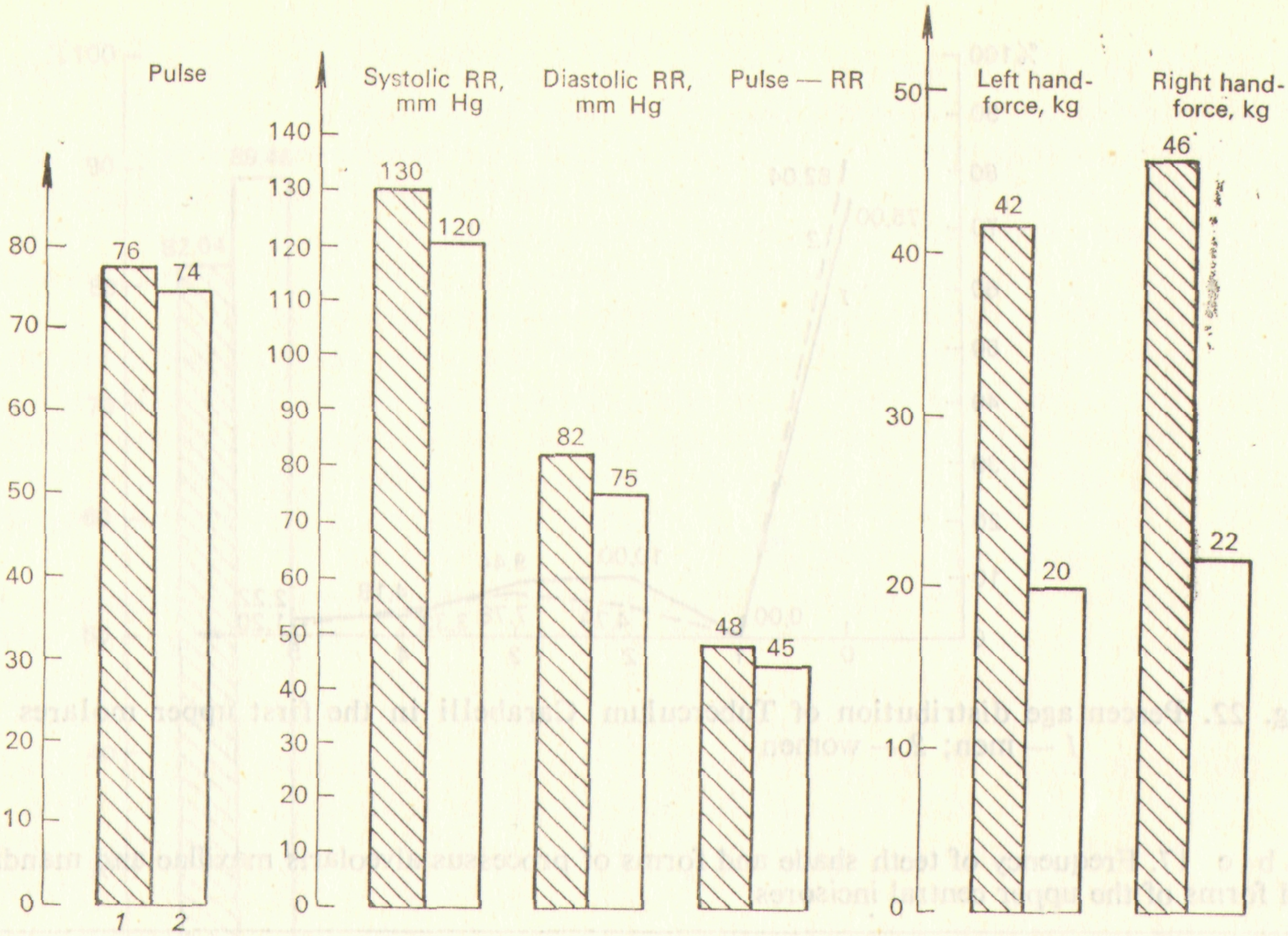


Fig. 23. Middle values of physiometrical features in men (*1*) and women (*2*)

sion by which it is found in women. The presence of the Tuberculum Carabelli repeats the same tendency, i. e. it is more frequently (by 7 per cent) registered in the males from Mihaylovgrad region.

It is noteworthy that in contrast to what is known in the literature [37, 40] sexual dimorphism applied to the spade-shapedness in the upper first molars is strongly expressed. Final assessment of this fact is, however, only possible after the wholesome processing of the data characterizing the entire country.

VI. Physiometric features

Human organism is a self-regulatory system aimed at maintaining physiological homeostasis in it. That is why, it is impossible to work out a through objective anthropological characterization of the population without including the basic physiometric features: pulse frequency, systolic and diastolic blood pressure and as a derivative — the pulse blood pressure, vital capacity of the lungs, strength of left and right hand.

677 individuals were investigated (341 men and 336 women) at an age of 30-39 years from 21 foci in 19 settlements of the Mihaylovgrad region. Data about the district, as a whole, have been processed statistically, as well as about the three regions of Vratza, Mihaylovgrad and Vidin, plus the total of the three big towns (over 50 000 inhabitants), plus the eight small towns (under 50 000 inhabitants) and the eight villages.

Upon comparison of data concerning men and women as a whole for the entire Mihaylovgrad district (Figs. 23 and 24) it was established that there exist significant differences in the strength of the left and right hands and vital capacity between the sexes in favour of the male one. A tendency towards higher values of both systolic and diastolic blood pressures is also observed in the men.

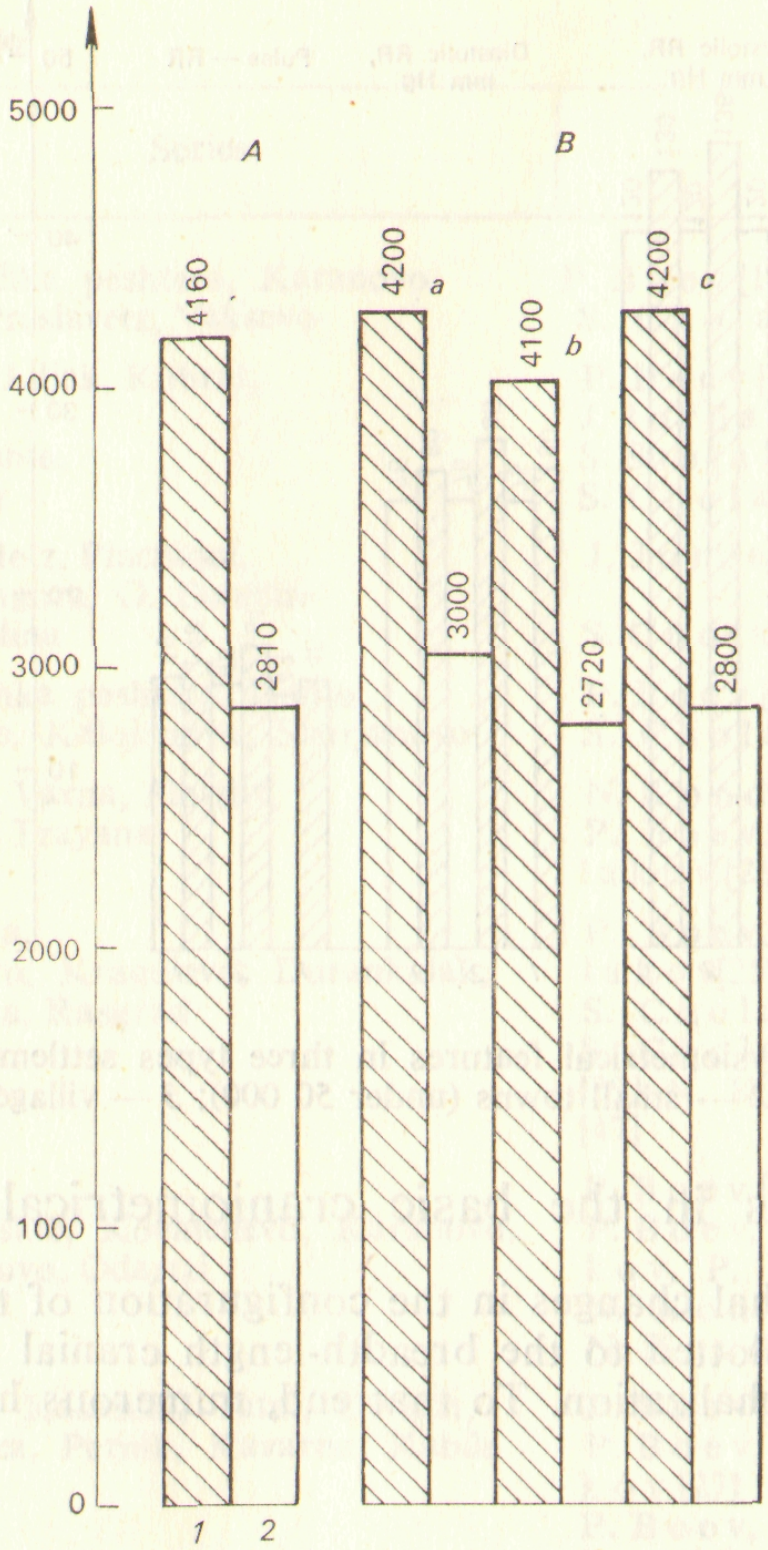


Fig. 24. Middle values of vital capacity in men (*1*) and women (*2*)
A — Mihaylovgrad region; *B* — three types of settlements; *a* — big towns (over 50 000); *b* — small town (under 50 000); *c* — villages

Aiming at determination of the influence of urbanization and geographic location of the given settlement the results valid for the three different types of settlements were compared (Fig. 25). Statistically significant differences in the pulse frequency, the diastolic blood pressure, and vital capacity of the lungs are not established. The systolic blood pressure reveals a tendency to higher values in the men from the smaller towns and villages. The strength of the left and right hands is of greater values in males from the villages which is logically explained by their greater physical activity. There are no differences whatever in the women of the different types of settlements.

The results obtained give grounds for the conclusion that excepting for the strength of hands there is no influence traced due to the urbanization and geographical location of the settlement on the physiometric features studied in the population of the Mihaylovgrad district. Even after the common analysis of the physiometrical features from whole Bulgaria it will be possible to be searched their connections with the individual's constitution type and the influence of the geographical, socio-economical, professional and other factors.

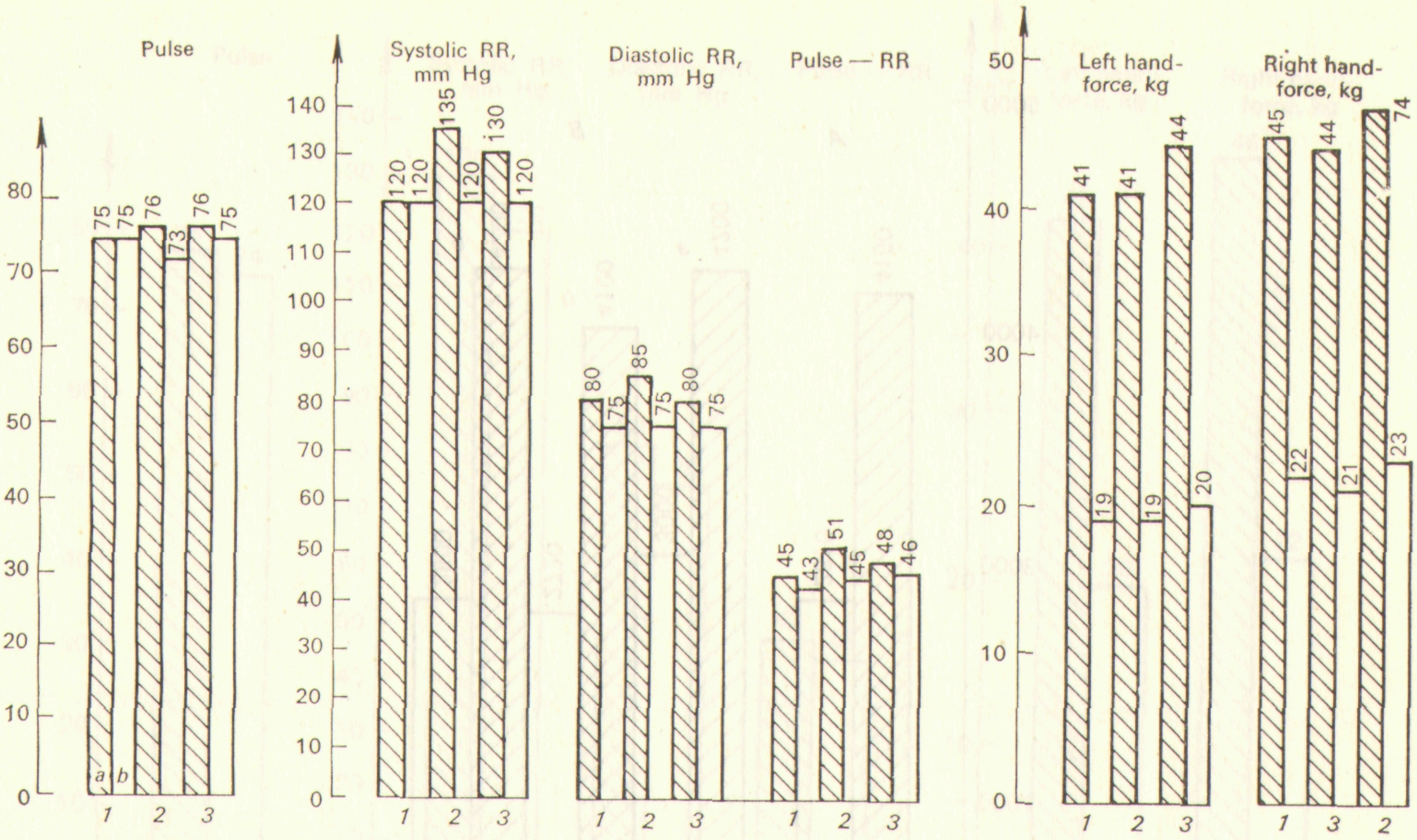


Fig. 25. Middle values of physiometrical features in three types settlements
1 — big towns (over 50 000); *2* — small towns (under 50 000); *3* — villages; *a* —men; *b* — women

VII. Epochal changes in the basic craniometrical features

In the study of the epochal changes in the configuration of the human skull major attention has been allotted to the breadth-length cranial index, which reflects the process of brachycephalization. To that end, numerous hypotheses have been

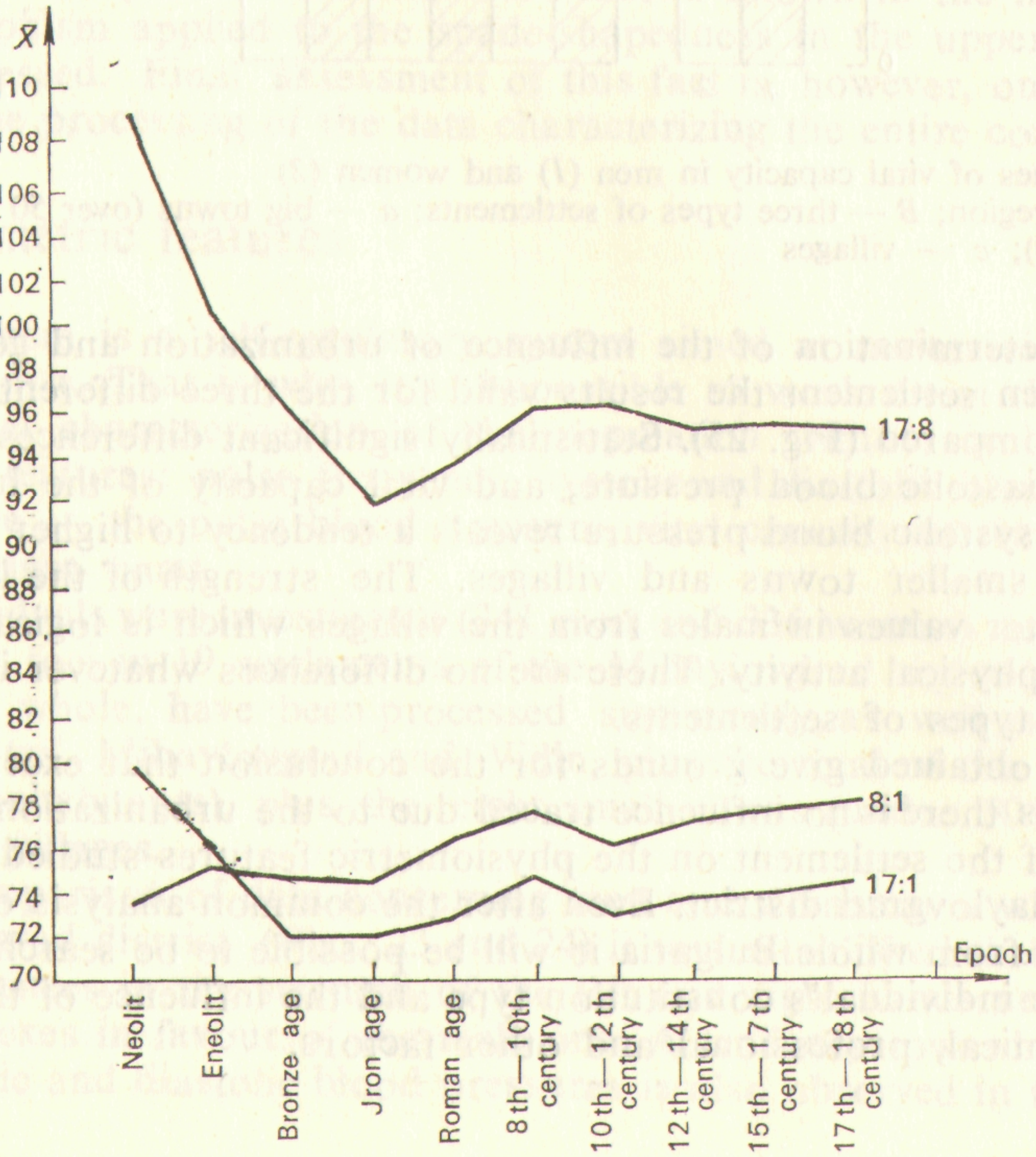


Fig. 26. Epochal changes in basic cranial indexes

T a b l e 18. Objects studies

Epoch	Series	Authors of study
Neolith	Dewetashka peshtera, Karanovo Malak Preslavetz, Vaksevo	P. B o e v [1] S. C h o l a k o v
Eneolith	Rousse, Liljak, Kubrat, Varna, Targovishte, Omurtag	P. B o e v [1] J. J o r d a n o v [10] S. Sh o l a k o v, P. B o e v [4] S. C h o l a k o v, J. J o r d a n o v
Bronze age	Belogradetz, Plachidol, Nova Zagora, G. Detelina, M. Detelina	J. J o r d a n o v, B. D i m i t r o v a [41 S. C h o l a k o v
Iron age	Devetashka peshtera, Dolno Sachrane, Kalojanovo, Sborjanovo	P. B o e v [1] S. C h o l a k o v, J. J o r d a n o v [53]
Roman age	Abritus, Varna, Plovdiv, Augusta Trayana	N. K o n d o v a [46] P. B o e v, N. K o n d o v a, S. C h o l a k o v [28]
8th-10th century	Ablanitza, Balgarevo, Kragulevo, Durankulak, Tabachka, Rasgrad	P. B o e v, N. K o n d o v a, S. C h o l a k o v[25]; P. B o e v, N. K o n d o v a, S. C h o l a k o v [2]; J. J o r d a n o v, S. C h o l a k o v [42]; I. I o r d a n o v [39]; N. K o n d o v a, S. C h o l a k o v [47]
10th-12th century	Lovech, Tuchovishte, Kovatchevo, Karanovo, Kalugerovo, Odartzi	P. B o e v [1] P. B o e v, N. K o n d o v a, S. C h o l a k o v, P. B o e v, S. C h o l a k o v, N. K o n d o v a, S. C h o l a k o v, N. K o n d o v a
12th-14th century	Lukovit, Kasanlik, Tatul, Urvitch, Poljanitza, Pernik, Kavarna, Kabile	P. B o e v [1] P. B o e v, N. K o n d o v a, S. C h o l a k o v [27] P. B o e v, N. K o n d o v a, S. C h o l a k o v [29] S. C h o l a k o v, N. K o n d o v a, P. B o e v [54]
15th 17th century	Nedelkovo, Kavarna, Kaliakra	P. B o e v, N. K o n d o v a, S. C h o l a k o v [26, 29]
17th-18th century	Gradishte, Ilijantzi	S. C h o l a k o v [52]

T a b l e 19. Epochal changes in basic cranial measures and indices

Epoch	Measures					Indices			
	1	8	17	45	48	8:1	17:1	17:8	48:45
Neolith	186,7	137,0	151,0	138,0	70,7	73,4	79,9	108,8	54,4
Eneolith	185,2	139,9	140,9	129,6	69,2	75,2	75,8	100,2	53,3
Bronze age	190,4	142,5	136,7	136,8	72,5	74,8	71,9	95,8	53,0
Iron age	189,7	141,0	134,6	128,0	70,8	74,6	72,0	91,6	55,9
Roman age	186,0	143,2	133,2	134,2	69,2	76,5	73,1	93,7	51,5
8th-10th century	183,4	142,0	135,0	133,0	71,5	77,7	74,7	96,2	53,9
10th-12th century	186,1	142,1	136,1	133,2	71,5	76,2	72,9	96,3	53,4
12th-14th century	185,2	143,0	136,3	133,5	70,4	77,3	73,8	95,2	52,5
15th-17th century	183,4	142,6	136,3	133,8	70,4	77,8	74,1	95,5	52,6
17th-18th century	181,9	142,3	135,7	131,3	68,9	78,3	74,6	95,4	52,6

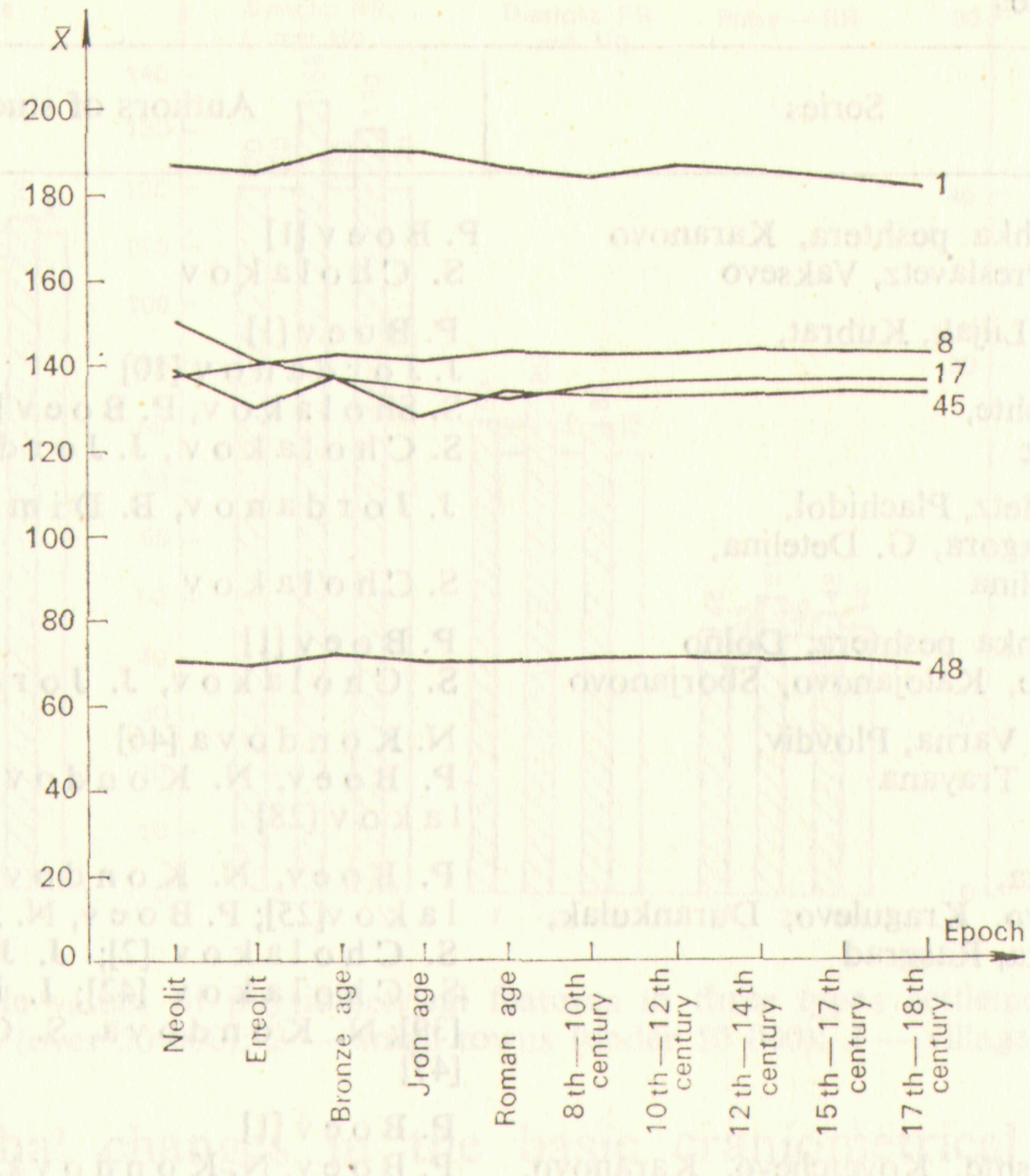


Fig. 27. Epochal changes in basic face measurements

proposed and the influence of a number of factors, bearing on evolution, selection, isolation, migration, some climatic and geographic conditions, etc., has been traced. The changes in the anthropological characteristics of skulls found in the Bulgarian lands reflecting the influence of those factors, along with the peculiarities, specific of this country, can be traced from the neolith to the beginning of the 20th century [47].

The object of this study are 48 craniological series from archaeological excavations of necropolises, dated from the early neolith to the end of the 18th century (Table 18). The comparative analysis is based exclusively on data concerning 980 male skulls. The 19th century period is represented by bone material preserved in monasteries [33], and the skulls from the Sofia military graveyard supply data about the early decades of the 20th century [43].

When the values of the cranial index are considered, its gradual increase becomes evident (Fig. 26). Starting at 73,4 in the neolith, it reaches 77,8 by the end of the 17th century and 78,4 in the 18th and 19th centures. Up to the end of the Iron Age dolichocrany prevails.

The early neolith crania are long, of medium breadth, and markedly high (Table 19). In Central Europe at that time the first manifestations of brachycephalization are observed, related to the emergence of the alpine racial type and the brachycranial cromagnoids. Protomediterranean racial types prevail among the neolith crania in the Bulgaria lands [1].

During the eneolith in these lands there is clear evidence of gracilization and brachycephalization, although dolicho-mesocranic, hipsicranic and acrocranic types still prevail. In the eneolithic population from Rousse alpine racial types was observed and emergence of dinarization among the population [1]. It must be emphasized that the eneolith witnesses the initial rise of brachycephalization

T a b l e 20. Territorial variations of cranial index during the Roman period

Series	Measures					
	1	8	17	45	48	8:1
Plovdiv	181,8	145,0	133,5	131,0	66,4	79,7
Abritus	186,0	144,6	134,1	132,0	66,3	77,5
Varna	188,2	142,6	134,7	139,5	72,0	76,4
Augusta Trayana	186,7	141,9	134,5	134,4	70,5	76,0
Total (n=102)	186,0	143,2	133,2	134,2	69,2	76,5

T a b l e 21. Territorial variations of cranial index during the Early Middle Ages (8th-10th century)

Series	Measures					
	1	8	17	45	48	8:1
Ablanitza	179,2	144,7	127,6	124,8	64,3	80,8
Rasgrad	185,5	144,3	138,7	137,0	75,2	77,9
Tabachka	183,6	142,0	132,8	132,0	71,1	77,7
Durankulak	182,4	140,9	137,3	133,2	72,3	77,6
Bulgarevo	183,6	141,0	135,3	135,7	64,7	76,9
Kragulevo	186,8	140,7	135,9	133,6	71,2	75,3
Total (n=85)	183,4	142,0	135,0	133,0	71,5	77,7

whose peak is clearly observable on the diagram (Fig. 26). In the Bulgarian lands this can be attributed to the diversity of dolichomesocranic, intermediate variants marking the transition from protomediterranean to gracile mediterranean racial types [1, 4, 10]. In the Bronze Age the skulls remain dolichocranic, with a certain increase of both their length- and width measures [41]. The cranial length reaches its maximum (Fig. 27).

The Iron Age is likewise repsesented by dolichocranic skulls, though lower and a little wider, with considerably narrower faces [1, 53].

The basic cranial measures substantially alter their characteristics during the Roman period, when the cranial and bizygomatic breadth reach their maximum, while the height from the basion and the upper-face height reach the minimum. Distinct territorial difference are also characteristic of the period. Although all the studied series are mesocranic, substantial differences in their structure are observed. In Augusta Trayana (Southern Bulgaria) [28], for instance, the predominant number of crania are long and very long, 40 per cent of them being dolichocranic, while among the Abritus and Varna populations (Northern Bulgaria) [46] dolichocranic and brachycranic skulls are evenly represented. Great variability, with different combinations of width- and height measures, is also observed in the facial part (Table 20). These peculiarities are probably related to the more intensive migration processes in the Northern Roman province — Mizia, while in Trakia it was the representatives of the authochthonic population and immigrants mainly from the Mediterranean regions that prevailed.

The second distinct peak in the curve, representing the cranial index changes, is reached during the Early Middle Ages. Its higher values are connected mainly with the cranial length decrease (Fig. 26, 27). At the same time, an increase in the upperface height is in evidence, along with other specific changes in the facial part. Mesobrachycranic skulls appear, with mongoloid traces in the chapes of the orbita, the nasal bones and the face profile. The territorial variations become even more conspicuous. One population from South-Western Bulgaria (Ablanitza)

Table 22. Territorial variations of cranial index during the Middle Ages

Series	Measures					
	1	8	17	45	48	8:1
	10th-12-th century					
Kalugerovo	180,8	141,8	134,0	132,8	70,5	77,7
Odartzi	185,6	143,4	134,3	133,8	71,4	77,2
Karanovo	185,8	140,1	135,6	131,6	69,6	75,5
Lovech	188,0	144,2	137,0	130,8	74,0	76,7
Tuchovischte	198,3	143,1	138,3	135,4	73,3	76,1
Total (n=69)	186,3	142,1	136,1	133,2	71,5	76,2
	12th-14th century					
Poljanitza	180,8	142,8	136,8	—	—	79,8
Pernik	183,8	145,4	135,9	135,9	70,2	78,9
Urvitch	187,2	145,1	133,2	135,0	69,5	77,8
Kabile	184,6	142,7	136,0	134,1	70,8	77,4
Tatul	187,8	147,7	139,5	135,7	70,5	77,0
Kavarna	183,0	140,8	137,8	131,6	72,0	76,6
Lukovit	186,4	140,7	139,4	129,1	66,4	75,5
Kasanlik	189,6	140,4	137,0	129,0	69,6	75,2
Total (n=163)	185,2	143,0	136,3	133,5	70,4	77,3
	15th-17th century					
Kaliakra	183,7	144,0	134,7	134,8	71,0	78,1
Kavarna	182,7	141,7	136,5	133,3	70,6	77,7
Nedelkovo	187,1	145,7	136,9	135,3	68,2	77,9
Total (n=134)	183,4	142,6	136,3	133,8	70,4	77,8

[25] is particularly prominent, with strongly brachycranic, narrow-faced skulls of small height. The opposite deviations are observed in the north-eastern part of Bulgaria. The crania from Durankulak [42]; Tabachka [39]; Kragulevo [24] and Bulgarevo [2] are longer, higher, with bizygomatic width and upper-face height and obvious mongoloid traces (Table 21). These measurements prove that the process of brachycephalization in the Bulgarian lands from the 8th to the 10th century was characterized by considerable regional variations.

In the subsequent period (10th-12th century), the process of brachycephalization slows down (Table 22). The cranial index decreases, while the cranial length is the greatest as compared to the whole medieval period.

From the 12th-14th century on the basic cranial measures and indices preserve a constant tendency in their changes. The cranial length progressively decreases, along with a parallel, but less marked reduction of width. Although all the series studied are mesocranial, there are considerable inter-group difference, which makes it possible to trace the territorial variations in the brachycephalization process. The comparison between the two large groups of Pernik [27] and Kabile [54], representative of Southwestern and Southeastern Bulgaria, reveals that the small variation in the cranial index values covers substantial structural differences (Table 22). The Pernik population in fact is mesobrachycranial (36 per cent brachycrany), with obvious mongoloid traces in the facial part. In the Kabile series which is mesocranial as well, brachycranial forms are almost completely lacking. The skulls from that region are narrower, relatively longer and more gracile. That, along with the prevalent mediterranean features, makes the differences between the two

T a b l e 23. Changes of cranial index in children

Cranial index	Infans I 12th-14th century	Infans I 15th-17th century	Infans II 12th-14th century	Infans II 15th-17th century
Dolichocran	—	2,61	—	5,00
Mesocran	34,78	28,70	53,85	40,00
Brachycran	56,52	47,83	30,77	43,33
Hyperbrachycran	8,70	20,87	15,38	11,67

populations even more obvious. They reflect the later migration processes, related to the kuman and pecheneg invasion in the 11th century.

In the Late Middle Ages Kaliakra, Kavarna [29], Nedelkovo [26] the inter-groups differences are less clear-cut. The cranial length continues to decrease and the index is slightly increased (Table 22).

The 18th century is represented from the populations in Gradishte and Ilienzi [52] which were characterized with a rise in the value of the cranial index, in return for a decrease of the cranial length (Table 19).

The 19th century is represented by data from Vatev's research, in monastic bone-vault supply evidence concerning three regions — Mizia, Trakia and South-western Bulgaria [34]. The cranial index changes are most significant in Mizia (79,1) and least so in Trakia, where also the relatively longest speciment (77,6), with correspondingly the least cranial width, have been found.

In the beginning of the 20th century, in the crania from the Sofia military graveyard, the length is once again strongly reduced. In ten of the regions studied it varies from 174,6 mm to 178,3 mm, and in the Rila-Pirin region alone it is 180,1 mm. The percentage of brachycranial forms is significantly increased as well.

These regularities observed in the process of brachycephalization are also corroborated by the evidence concerning the cranial index changes in children (Table 23). Among the 12th-14th century populations in Infans I, for instance, 65,2 %of the skull are brachy- and hyperbrachycranial, while in the next age group (7-14 years) the cranial index drops to mesocranial in 54 % of the cases. In the late medieval population this ratio does not change until Juvenis-group, when brachycrany drops below 50%.

Among the factors affecting the changes in the basic cranial measures those that rank first are indubitably migration process and metissation. However, other factors such as isolation, epidemics, the different protein balance, jodid and iron deficit, etc., shoud not be underestimated. It is selection that is considered to be the main factor in the process of brachycephalization in Central Europe during the period between the 8th and the 18th centures [18]. Epidemic diseases and the different constitutionally conditioned resistance to them rank first. There is historical and archaelogical evidence of a severe epidemic (probably plague) that struck the population of the roman city Augusta Trayana at the end of the 5th century.

With the Ablanitsa population the influence of the unintentional artificial skull deformation should be noted.

When compared to other European countries, the brachycephalization process in the Bulgarian lands is characterized by a significant retardation after its upward development during the Early Middle Ages, although some local fluctuations are observed. Conversely, in neighbouring Romania and Jugoslavia, the cranial index increase accelerates after the 16th century [16, 12]. Even steeper is the rise of the index change in Poland and Czechoslovakia [13, 8].

The results of this study suggest the following conclusions: the process of brachycephalization in the Bulgarian lands is comparatively slow, with considerable regional and diachronic variations; as a major emerges the reduction of skull length in human evolution; at the end of the Roman period and during the Middle Ages a significant influence was exerted by migration process and the various selection factors.

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ИЛДИКО ХАНКО ● МАРТА ЛАЦЗА

Човешките раси и типове

(ЧОВЕКЪТ ПО ЗЕМЯТА)

СПРАВОЧНИК

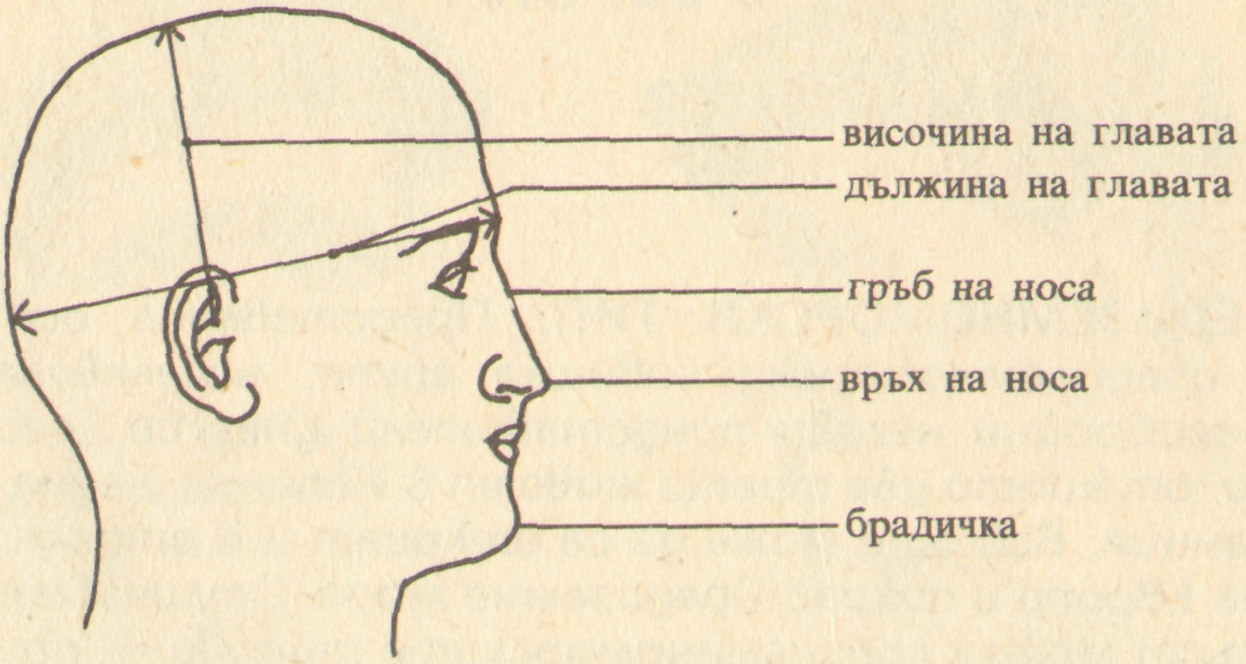
Превод от унгарски
Мария Попова

ДЪРЖАВНА ФИРМА
ИЗДАТЕЛСТВО „ПЕТЪР БЕРОН"
СОФИЯ, 1993

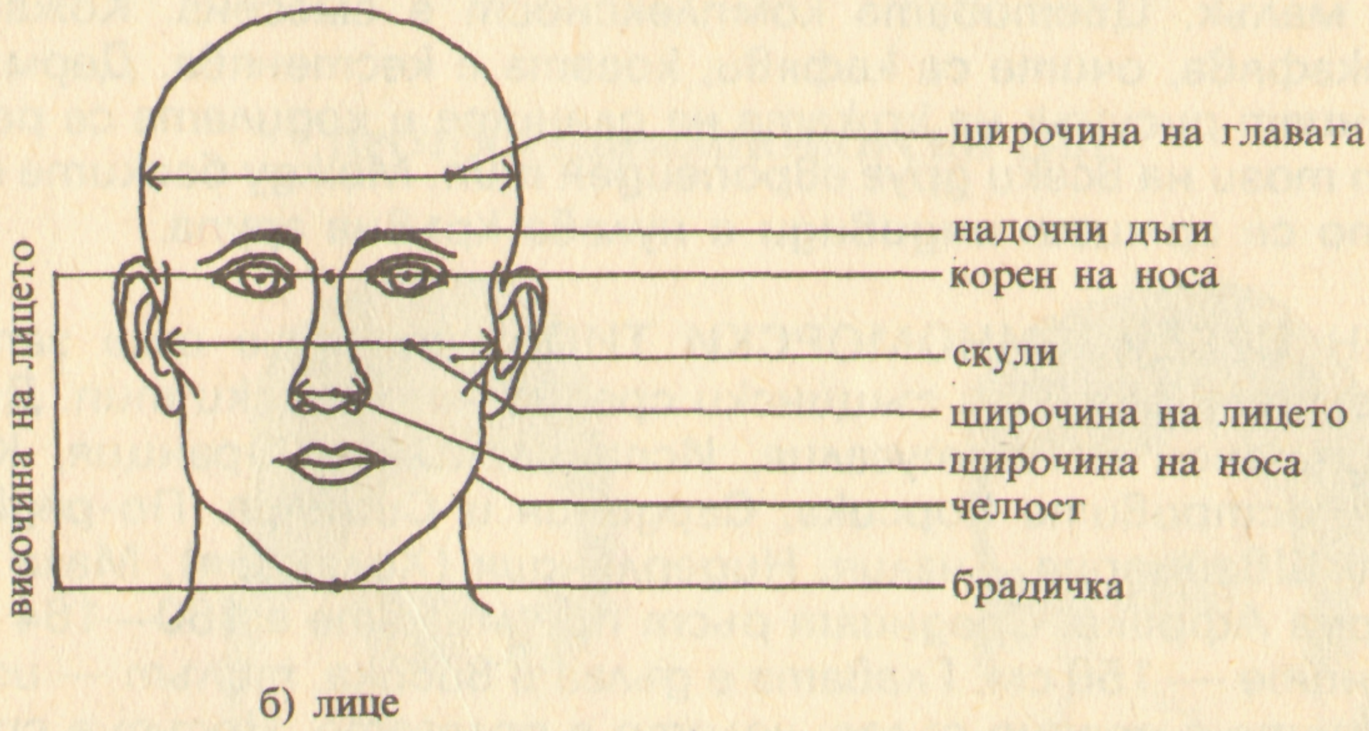
УДК 57

В справочника са дадени кратки описания на най-характерните човешки типове, разпространени на нашата планета. Човекът — това сложно биологично и социално същество — е разгледан от биологичен аспект в зависимост от условията на средата. За всеки расов тип са посочени континентът, държавите и областите, където се среща, както и характерни антропологични белези — тяло, ръст, основни измерения на главата и лицето, пигментацията на кожата, очите и косата. Представени са и най-типичните за всеки континент метисни расови форми. Изданието е богато илюстрирано с цветни рисунки по действително съществуващи индивиди.

Emberek
Móra ferenc könyvkiadó, 1980.



а) глава — профил



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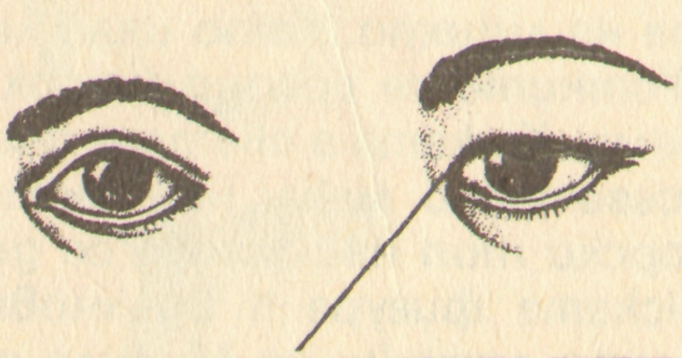


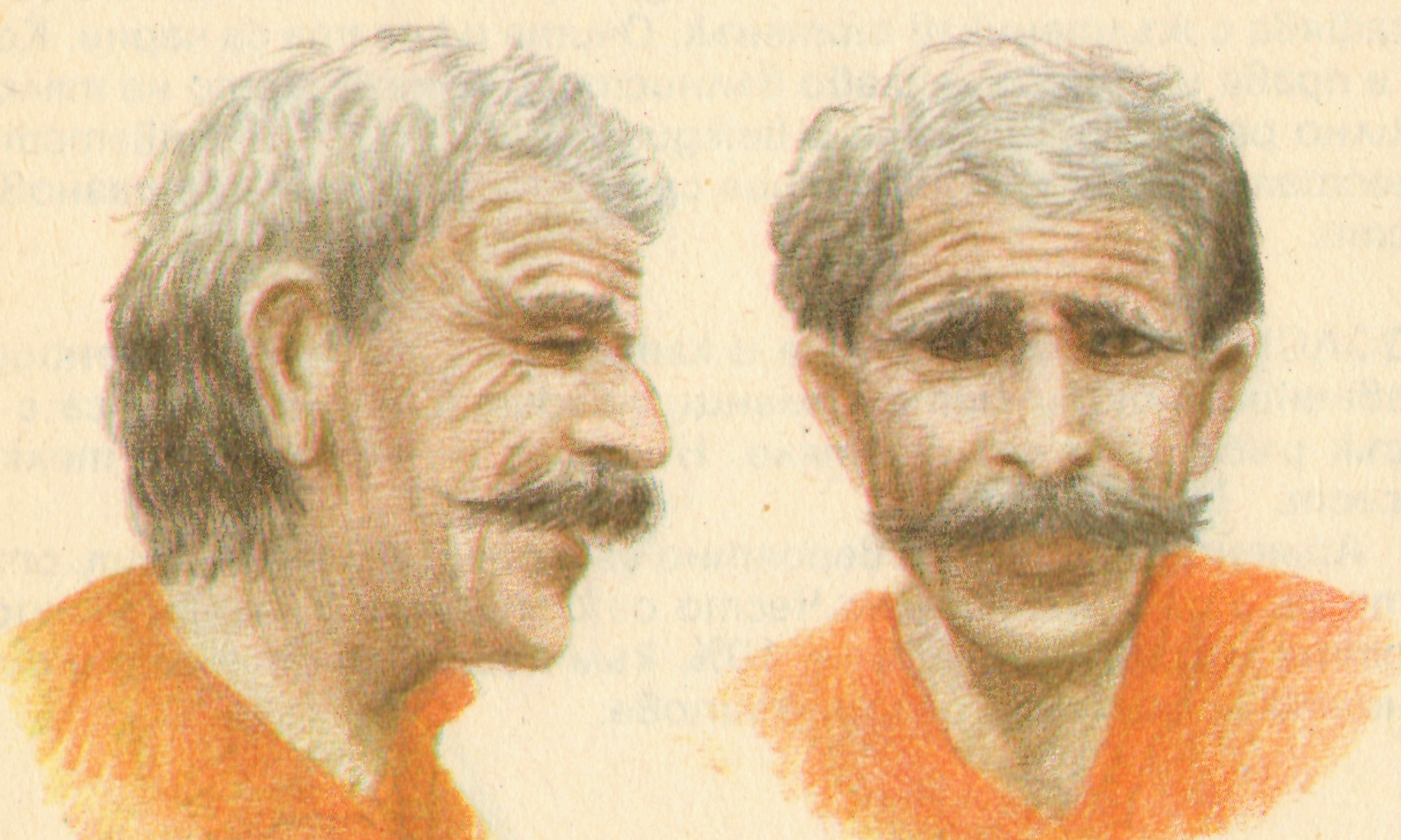
в) клепачни цепки

ОСНОВНИ АНТРОПОЛОГИЧНИ БЕЛЕЗИ НА ГЛАВАТА НА ЧОВЕКА

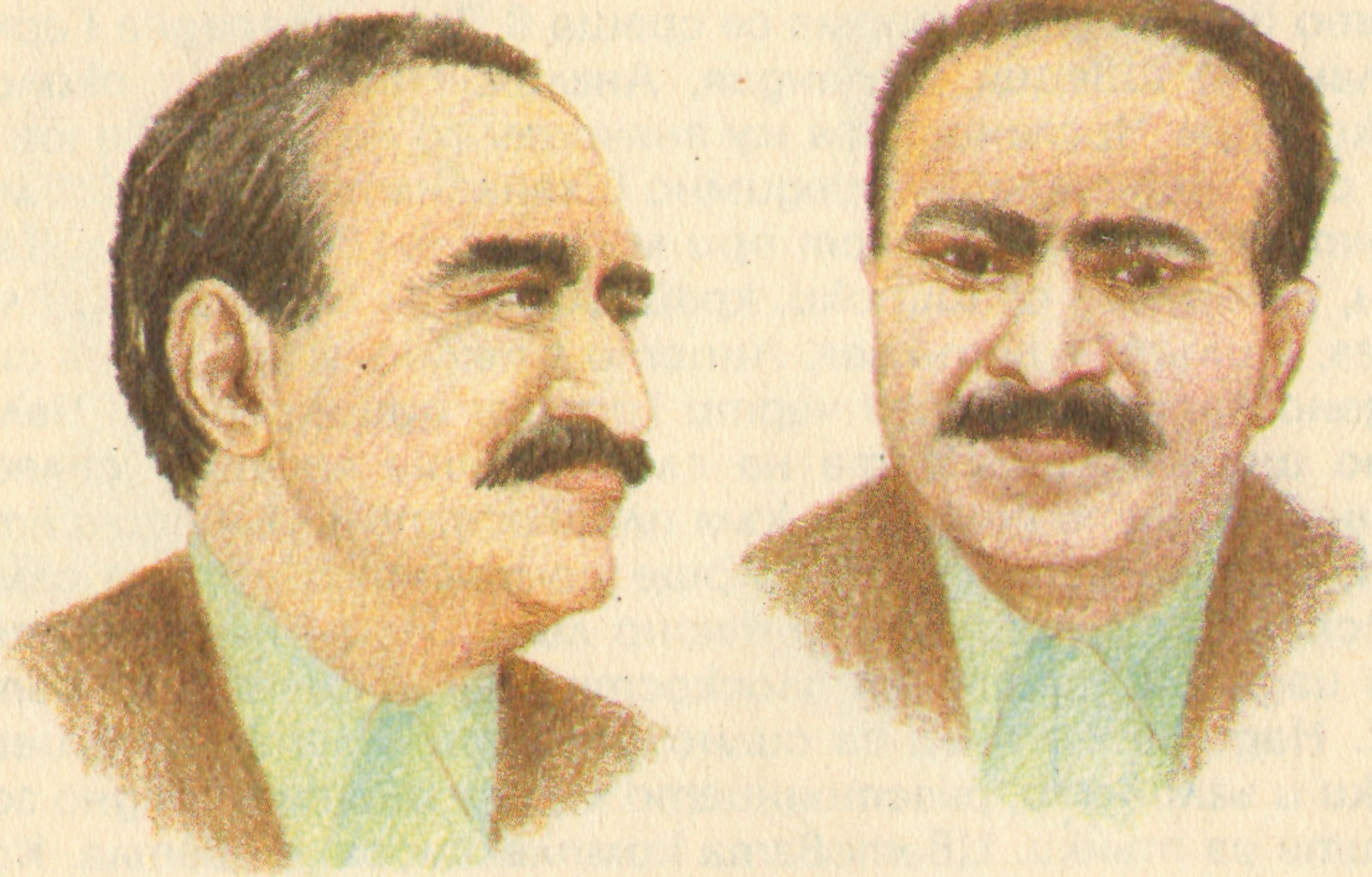
ПРОТОСРЕДИЗЕМНОМОРСКИ ТИП

ГРАЦИЛЕН СРЕДИЗЕМНОМОРСКИ ТИП

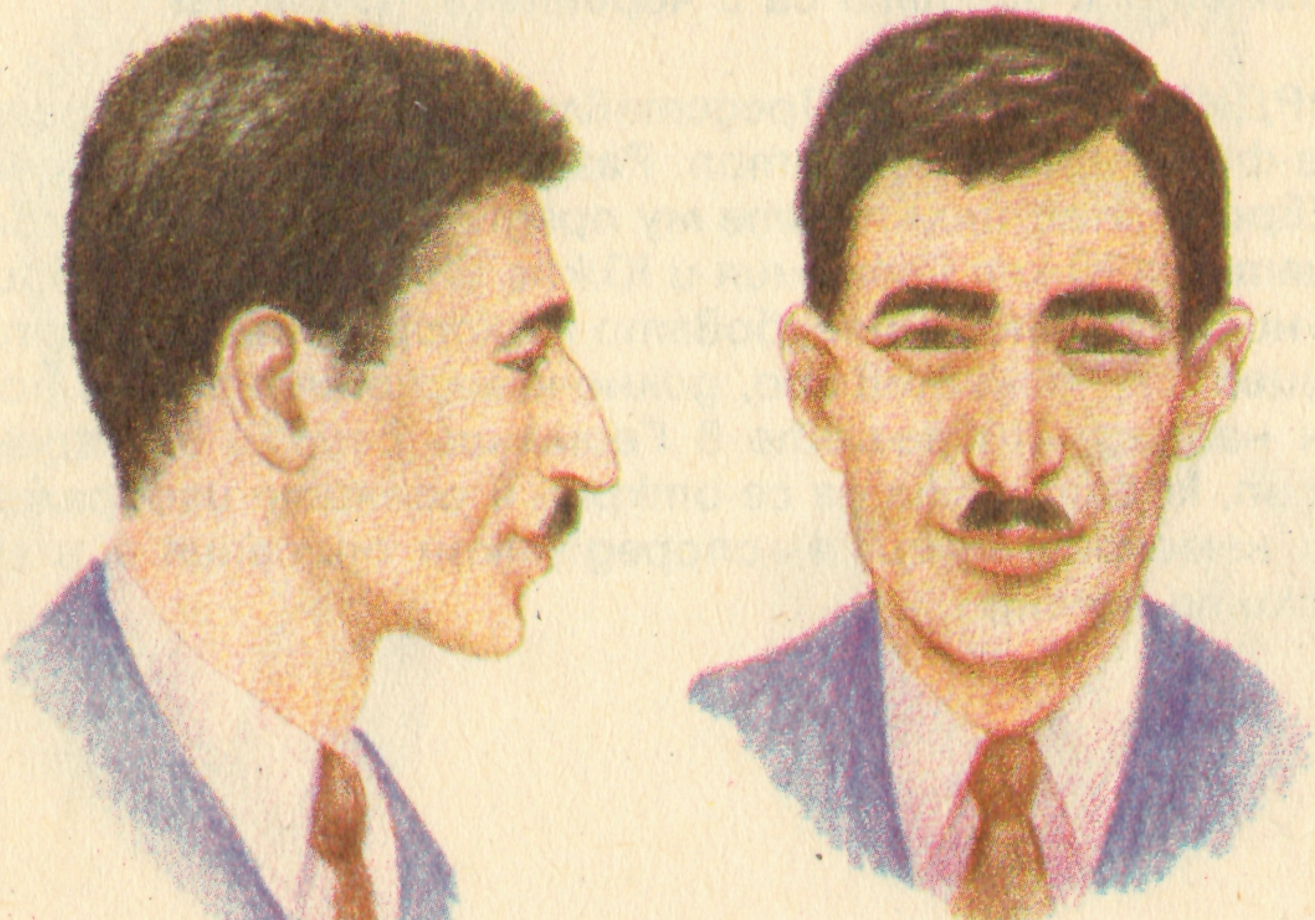
АТЛАНТО-СРЕДИЗЕМНОМОРСКИ ТИП



ДИНАРСКИ ТИП



АРМЕНОИДЕН ТИП



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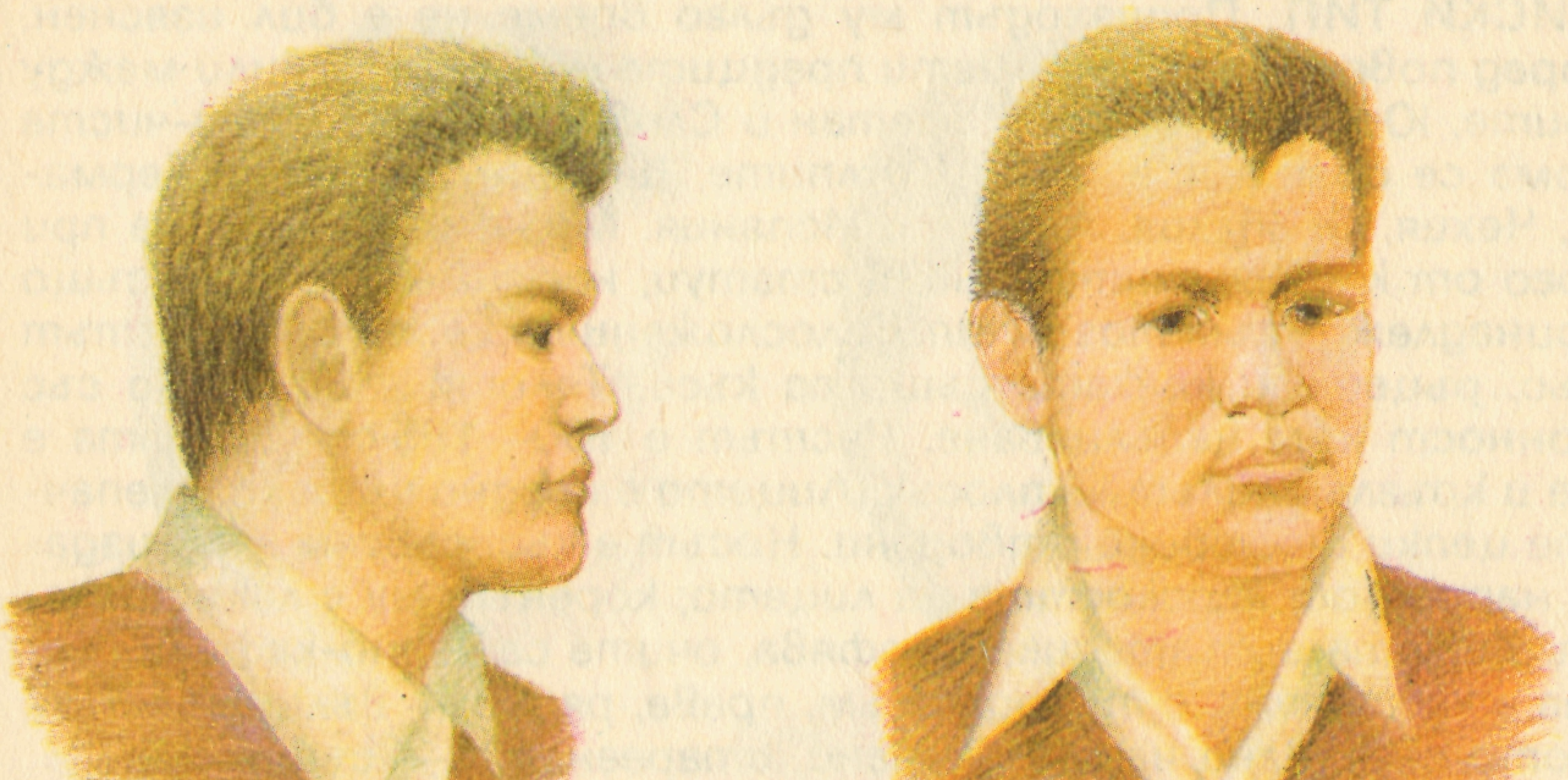
ФИНО-НОРДИЧЕСКИ ТИП



ДАЛО-НОРДИЧЕСКИ ТИП

КРОМАНЬОНСКИ ТИП

АЛПИЙСКИ ТИП

ЛАПАНОИДЕН ТИП

ИЗТОЧНОБАЛТИЙСКИ ТИП

ТУРАНСКИ ТИП

УРАЛСКИ ТИП

ИРАНСКИ ТИП

ОРИЕНТАЛСКИ ТИП

ИНДО-АФГАНСКИ ТИП

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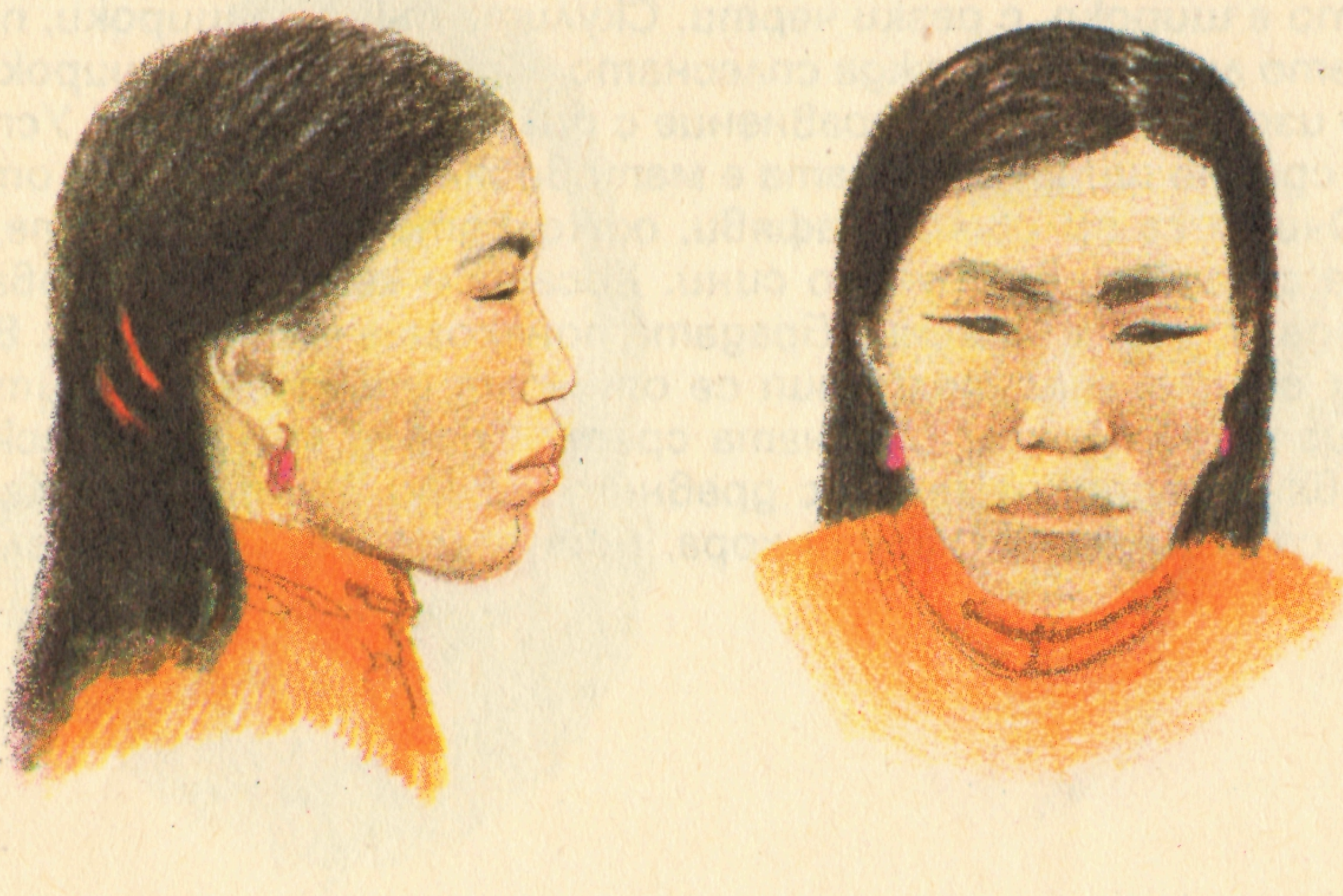

„КЛАСИЧЕСКИ“ МОНГОЛОИДЕН ТИП

ТУНГУСКИ ТИП

БАЙКАЛСКИ ТИП

СИНОИДЕН ТИП

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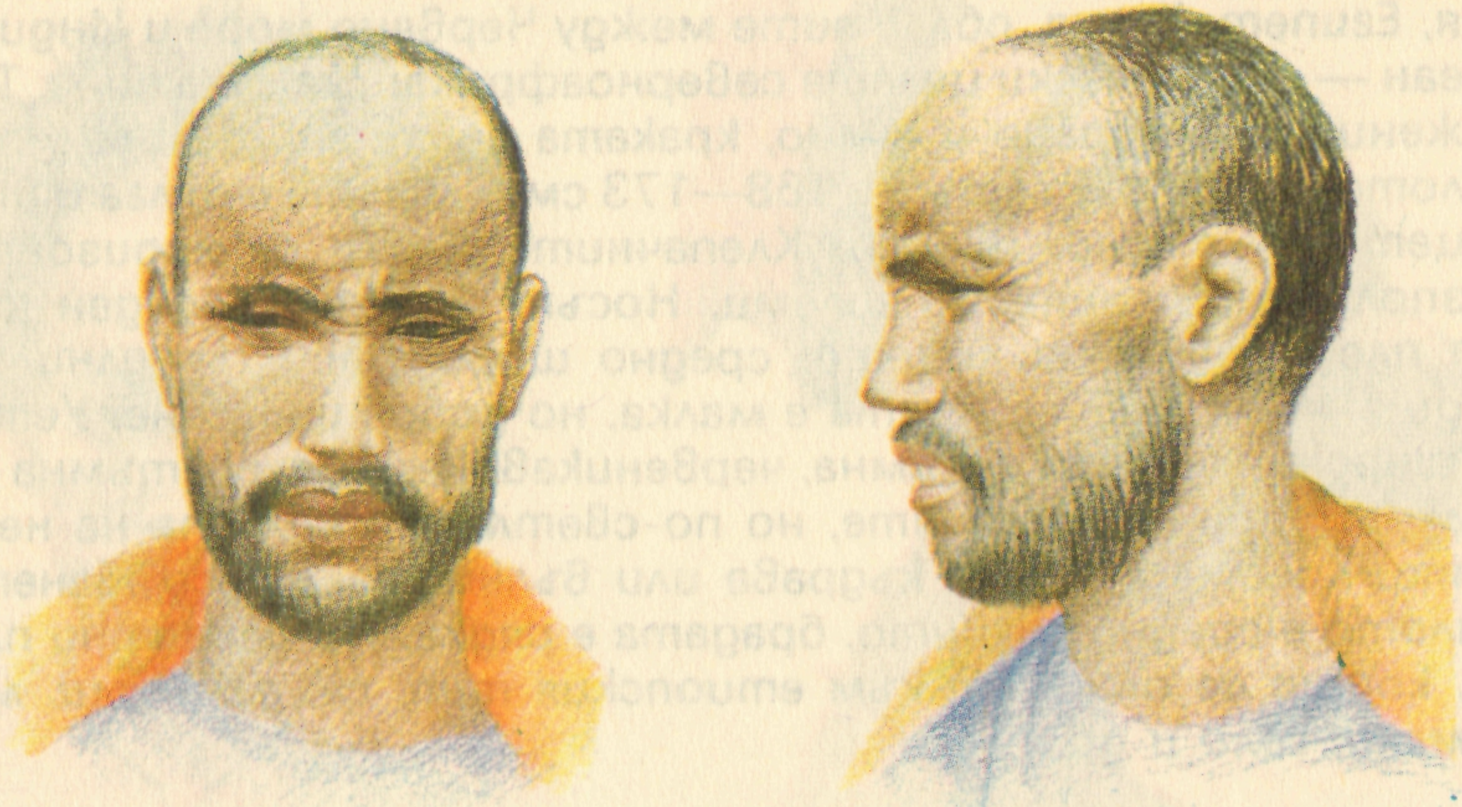
ПРОТОИНДОКИТАЙСКИ ТИП



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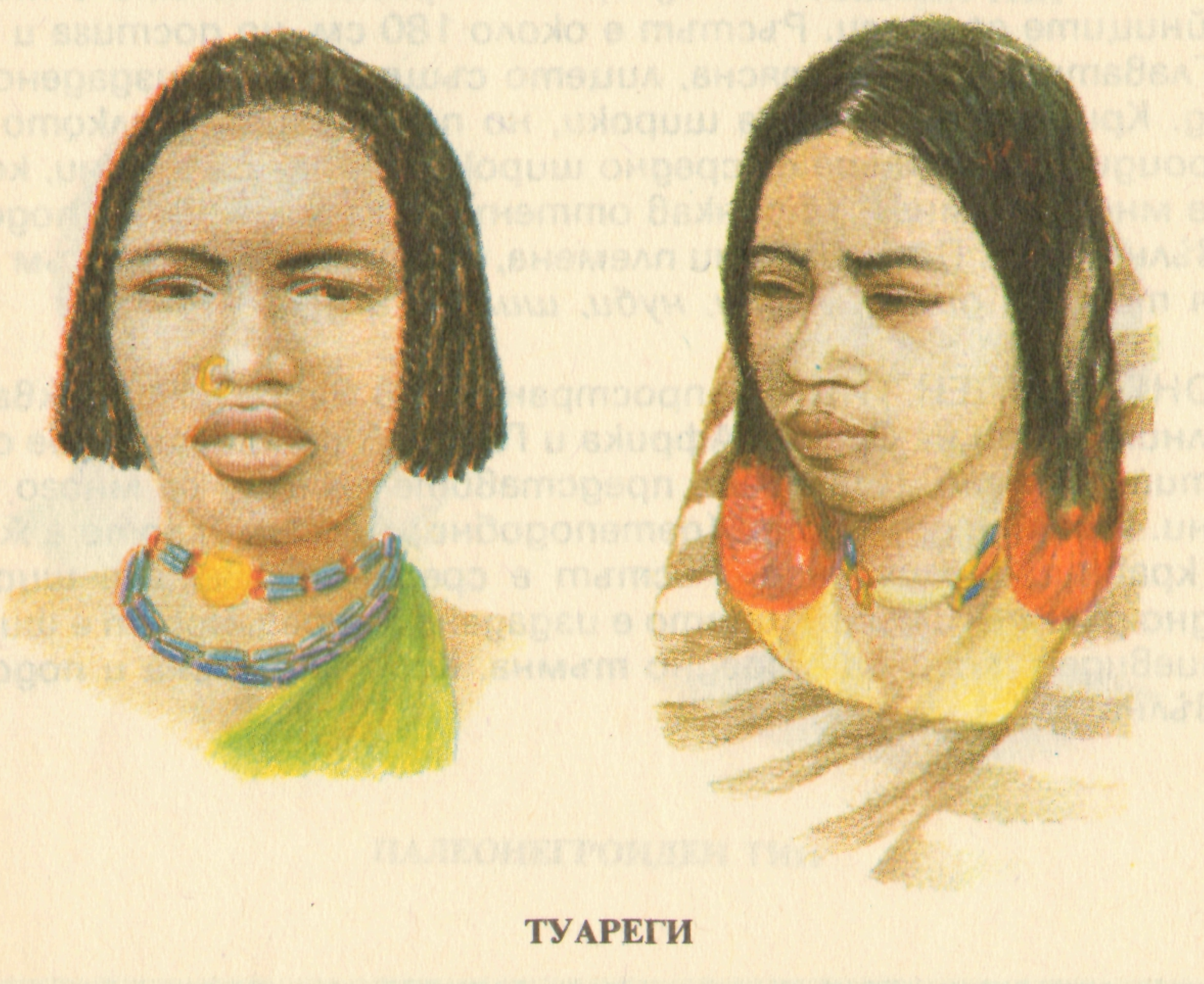

ТУАРЕГИ

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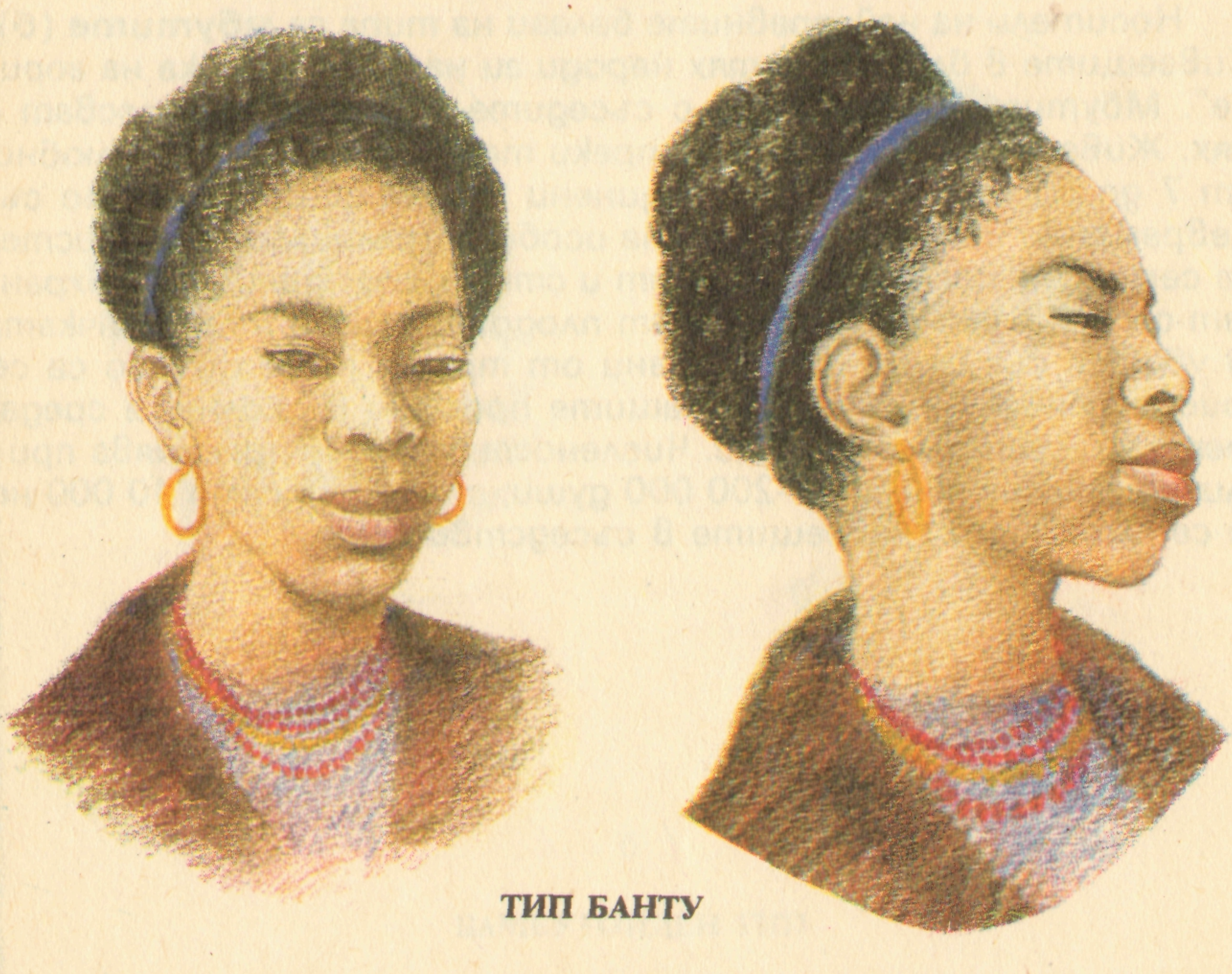

ТИП БАНТУ

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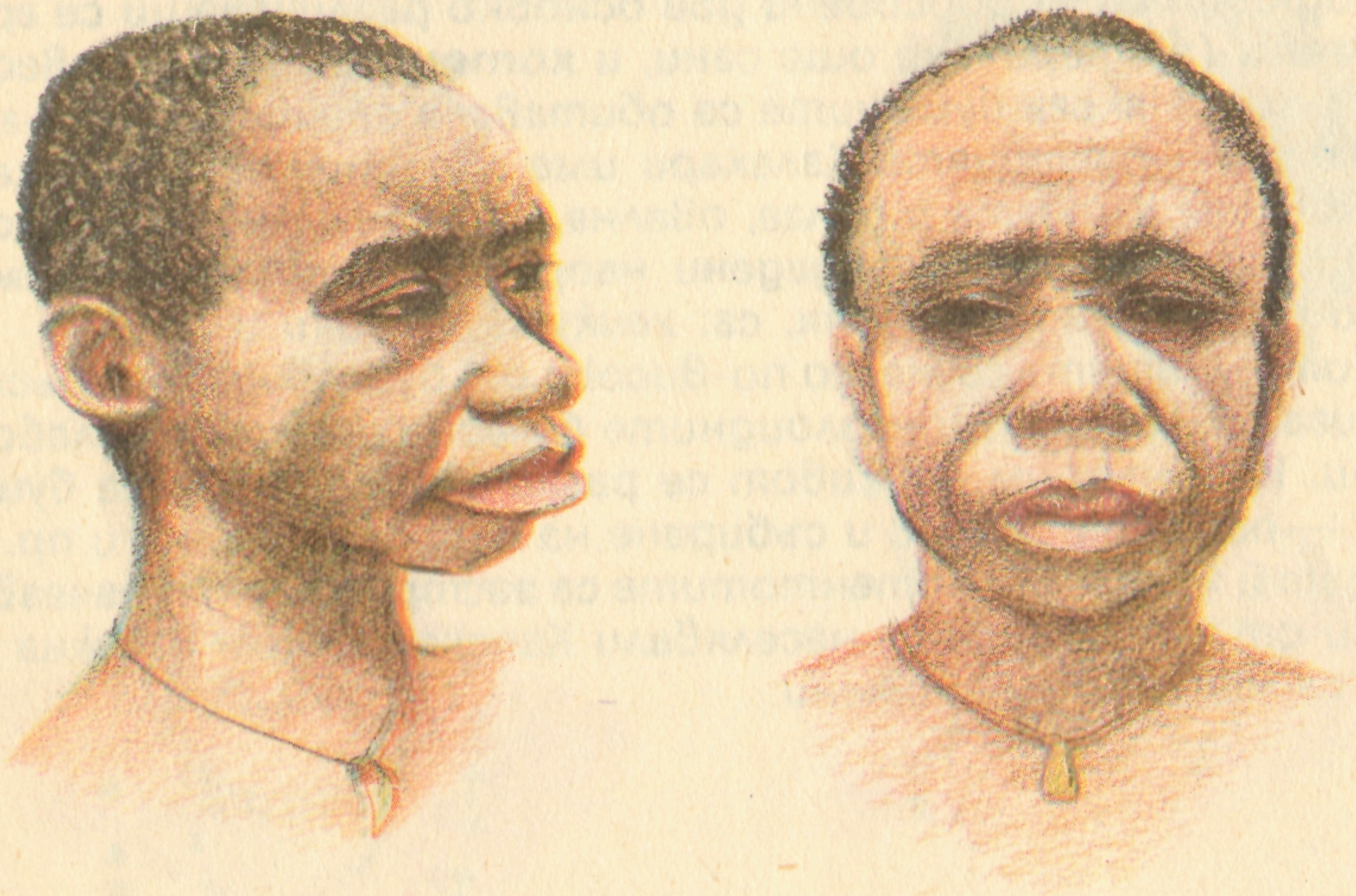

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БАМБУТОИДЕН ТИП

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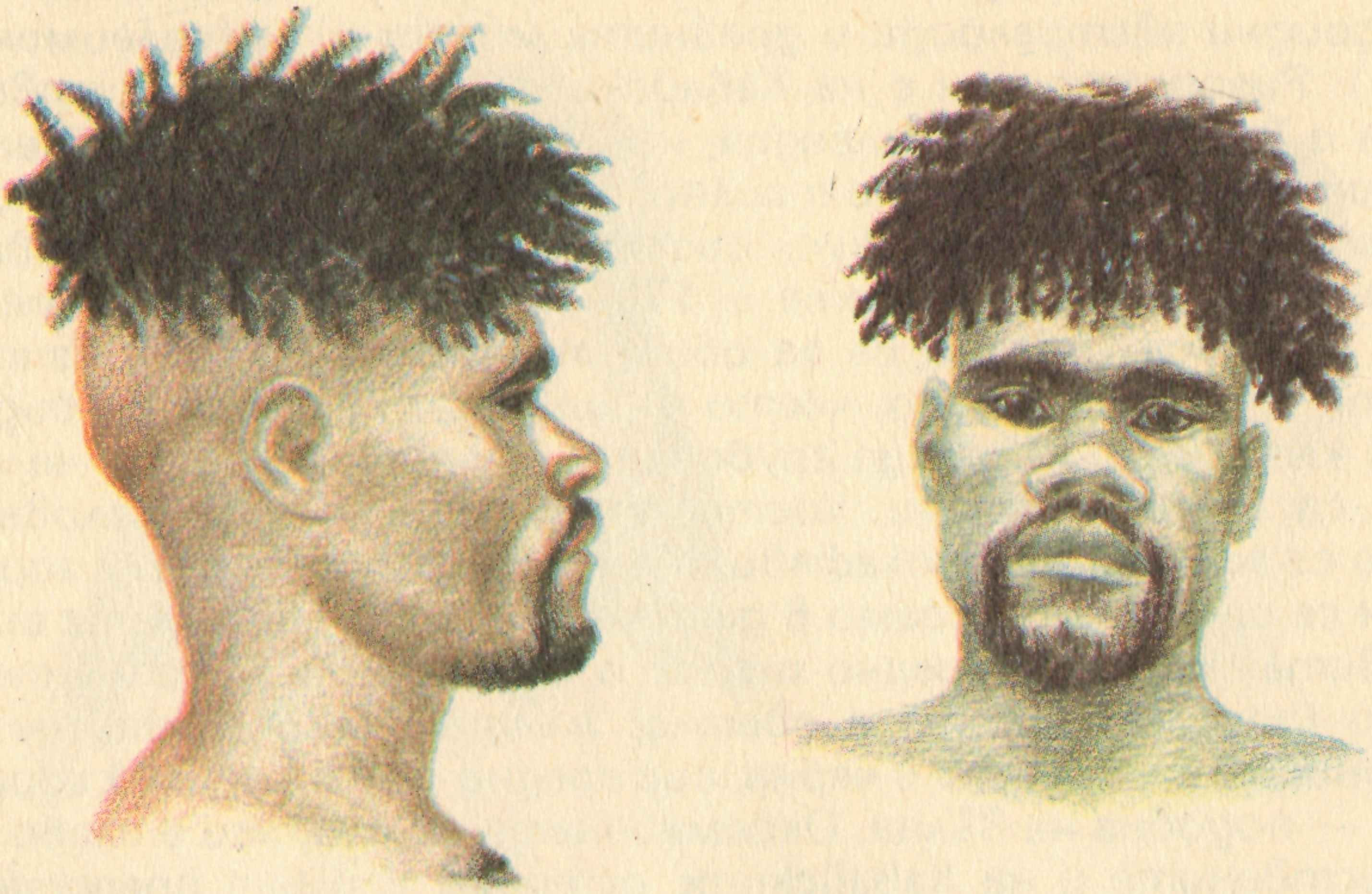
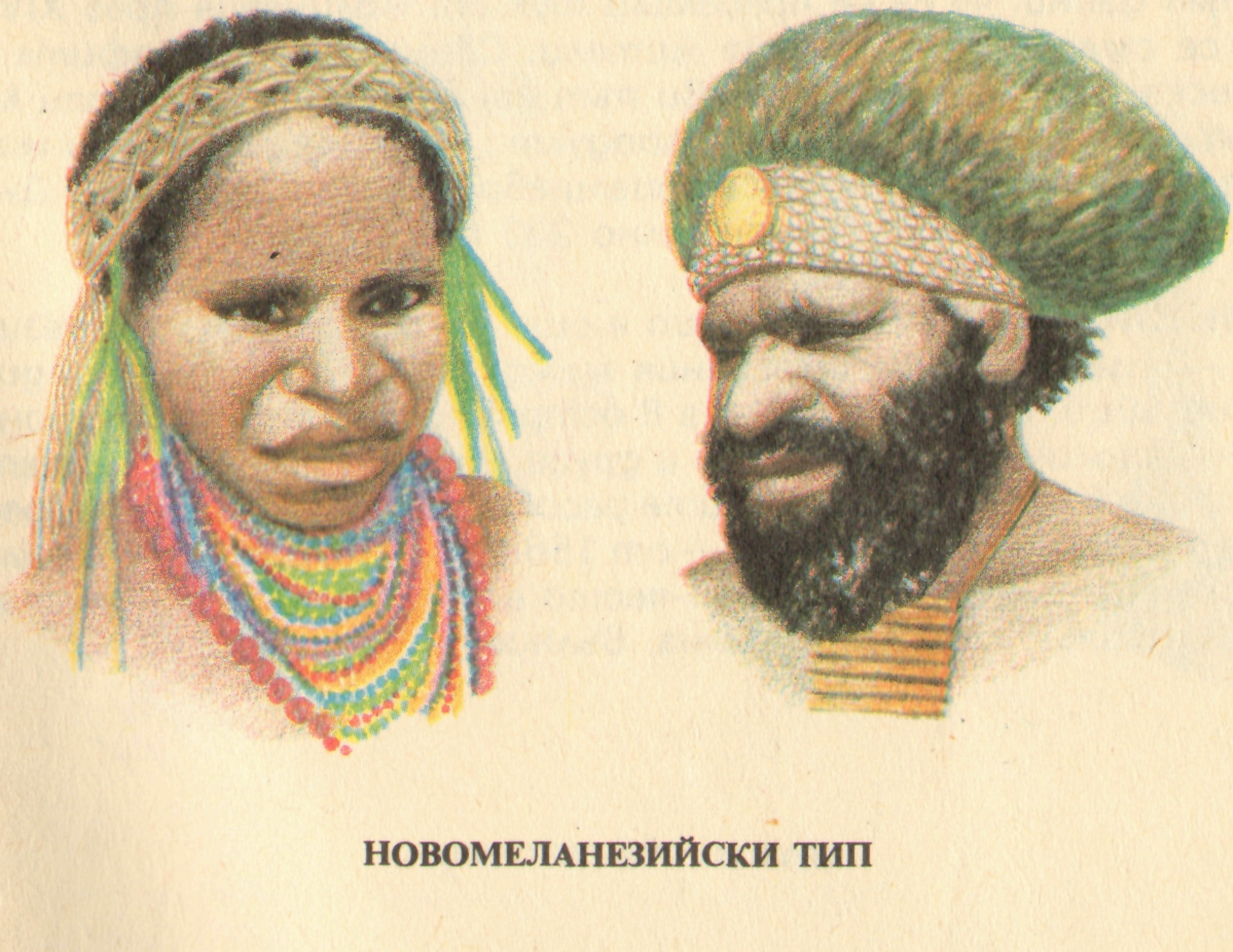
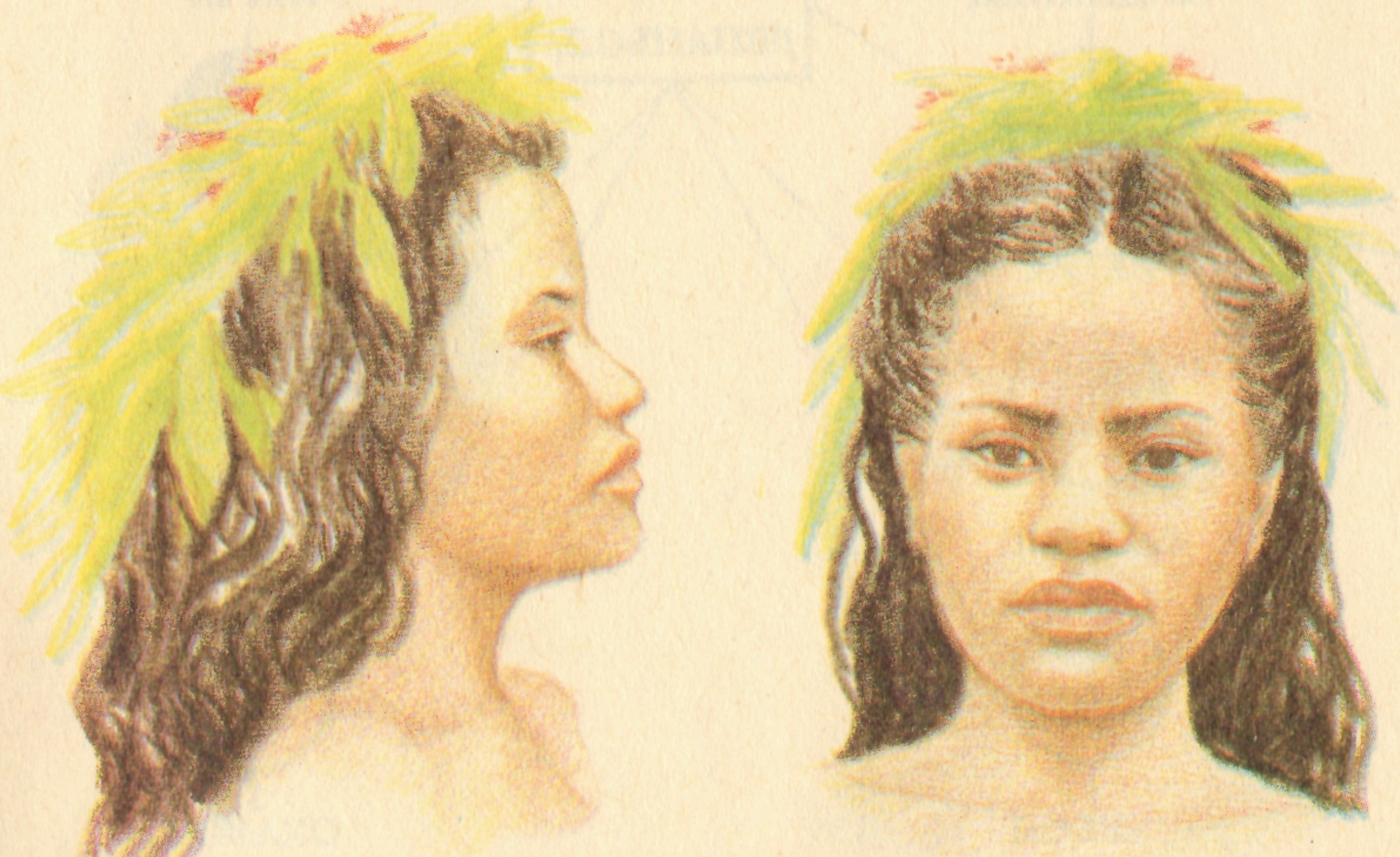


ПАЛЕОМЕЛАНЕЗИЙСКИ ТИП



НОВОМЕЛАНЕЗИЙСКИ ТИП

ПОЛИНЕЗИЙСКИ ТИП



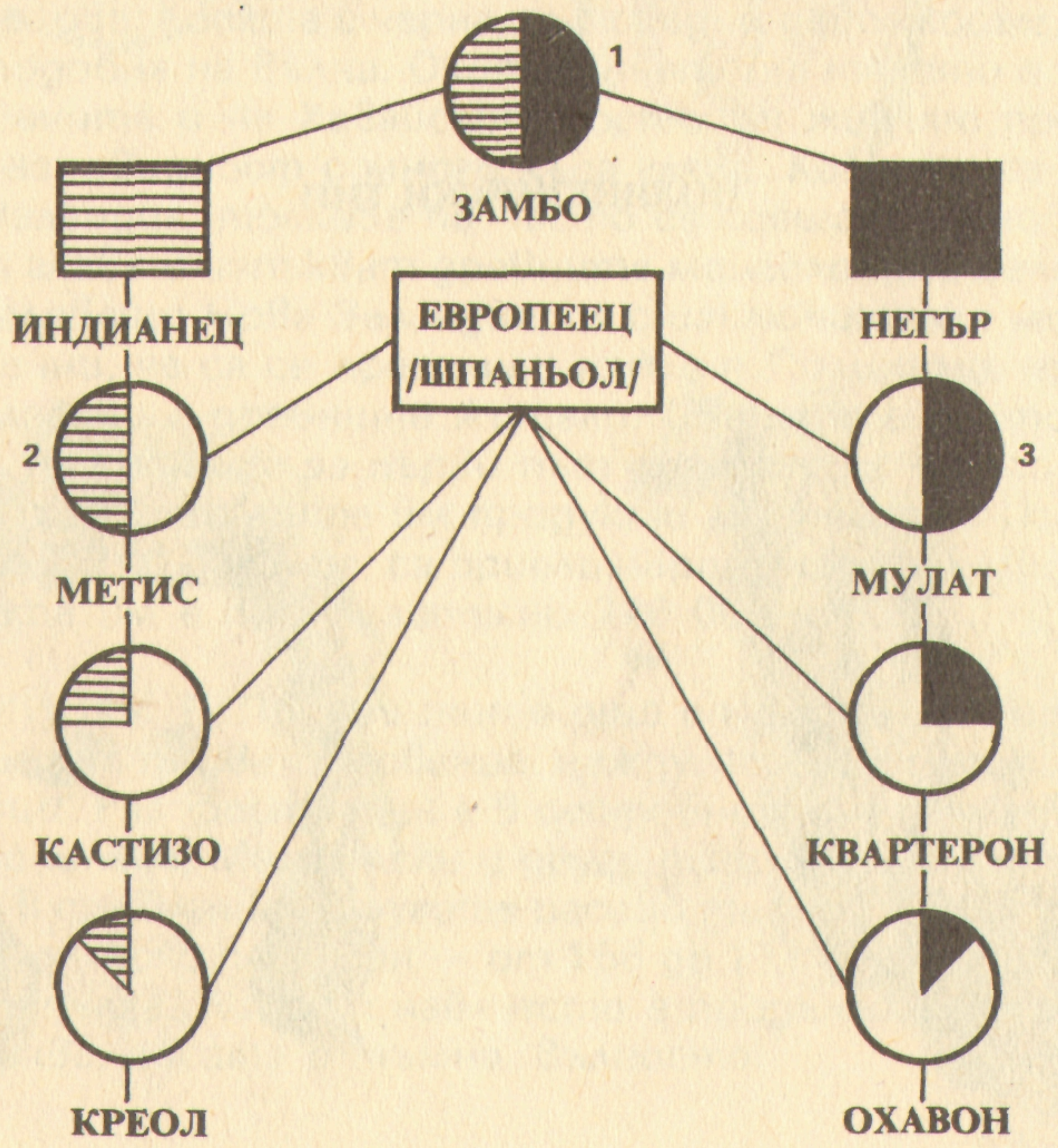
МИКРОНЕЗИЙСКИ ТИП

МЕТИСНА ФОРМА
ИНДИАНЕЦ — НЕГЪР /1/

МЕТИСНА ФОРМА
ЕВРОПЕЕЦ — ИНДИАНЕЦ /2/

МЕТИСНА ФОРМА
ЕВРОПЕЕЦ — НЕГЪР /3/

Разгледахме — макар и накратко — по-важните човешки типове от петте части на Земята. Не трябва обаче да се смята, че отделните народи се състоят от описаните в книгата чисти типове. Всяка отделна раса, както е отбелязано във въведението, е географски ограничено единство на местното народонаселение. Днес това ограничаване — с изключение на някои изолирани области — вече не съществува. С развитието на комуникацията почти нищо не е в състояние на попречи на смесването на отделните човешки групи. Непрекъснато се появяват и непрекъснато се асимилират различни расови типове. Независимо от това промяната в структурата на човешкото тяло не е толкова бърза, за да отпадне необходимостта от всякаква систематика. Трябва обаче да се има предвид, че възприетите единици за класификация в бъдеще може да претърпят промяна.



ПРИМЕРНА СХЕМА ЗА СМЕСВАНЕ НА ПРЕДСТАВИТЕЛИ НА ГОЛЕМИТЕ ЧОВЕШКИ РАСИ И ПОЛУЧЕНИТЕ МЕТИСНИ ФОРМИ

ЧОВЕШКИТЕ РАСИ И ТИПОВЕ

ЦЕНА 17,00 ЛВ.